“ROLE OF MDCT (128 SLICE SCANNER) IN EVALUATION OF FOCAL PANCREATIC MASS LESIONS”

DISSERTATION SUBMITTED TO
THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI
IN PARTIAL FULFILLMENT OF THE REGULATIONS FOR THE AWARD OF DEGREE OF M.D IN RADIODIAGNOSIS.

BY

DR . N.AISWARYA LAKSHMI

GUIDE : DR. B.DEVANAND

DEPARTMENT OF RADIOLOGY

PSG INSTITUTE OF MEDICAL SCIENCES AND RESEARCH
PEELAMEDU, COIMBATORE – 641004
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CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled **" ROLE OF MDCT (128 SLICE SCANNER) IN EVALUATION OF FOCAL PANCREATIC MASS LESIONS"** is the bonafide original work of **Dr. N.AISWARYA LAKSHMI** in the department of **Radiodiagnosis, PSG Institute of Medical Sciences and Research,** Coimbatore in partial fulfillment of the regulations for the award of degree of M.D in Radiodiagnosis.

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Professor, HOD,

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CERTIFICATE

PSG INSTITIUTE OF MEDICAL SCIENCES AND RESEARCH

COIMBATORE

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Dean,
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Place : Coimbatore

Date: 14.10.17

DECLARATION

I, **Dr. N.AISWARYA LAKSHMI** solemnly declare that the dissertation titled **"ROLE OF MDCT IN EVALUATION OF FOCAL PANCREATIC MASS LESIONS"** was done by me at the department of Radiodiagnosis, PSG Institute of Medical Sciences and Research, Coimbatore during the period from December 2014 to September 2017 under the guidance and supervision of **Dr.B.DEVANAND,** Professor, Head of the Department, Department of **Radio Diagnosis, PSG Institute of Medical Sciences and Research,** Coimbatore. This dissertation is submitted to the Tamilnadu Dr.M.G.R. Medical University towards the partial fulfillment of the requirement for the award of M.D. Degree in Radiodiagnosis.

I have not submitted this dissertation on any previous occasion to any University for the award of any degree.

Place: Coimbatore **DR. N.Aiswarya Lakshmi**

Date : 14-10-2017

ACKNOWLEDGEMENT

Foremost, I would like to express my sincere gratitude to my professor and HOD and my guide **Dr. B. Devanand** for his ever friendly co-operation which was present throughout the preparation of this work. This work would not have been possible without his guidance, support and encouragement, **Dr. B. Devanand** will always be a key inspiration to me.

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My special thanks to **Dr.Karthikaeyan** and **Dr. Xavier** for helping me in statistics and formulating my thesis.

Last but not least , I would thank and dedicate this whole dissertation and all years of hard work to my whole Family and my God Almighty.

DR. N.Aiswarya Lakshmi

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee

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To
Dr N Aiswarya Lakshmi
Postgraduate
Department of Radiology
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Ref: Project No. 14/391

Date: December 19, 2014

Dear Dr Aiswarya Lakshmi,

Institutional Human Ethics Committee, PSG IMS&R reviewed and discussed your application dated 05.12.2014 to conduct the research study entitled "Role of MDCT (128 slice) in evaluation of focal pancreatic lesions" during the IHEC meeting held on 12.12.2014.

The following documents were reviewed and approved:

1. Project Submission form
2. Study protocol
3. Informed consent forms
4. Proforma
5. Permission letters from concerned Heads of department
6. Current CVs of Principal investigator, Co-investigators
7. Budget

The following members of the Institutional Human Ethics Committee (IHEC) were present at the meeting held on 12.12.2014 at IHEC Secretariat, PSG IMS & R between 10.00 am and 11.00 am:

Sl. No.	Name of the Member of IHEC	Qualification	Area of Expertise	Gender	Affiliation to the Institution Yes/No	Present at the meeting Yes/No
1	Dr. P. Sathyan (Chairperson, IHEC)	DO, DNB	Clinician (Ophthalmology)	Male	No	Yes
2	Dr. S. Bhuvaneshwari (Member-Secretary, IHEC)	MD	Clinical Pharmacology	Female	Yes	Yes
3	Dr. S.Shanthakumari	MD	Pathology, Ethicist	Female	Yes	Yes
4	Dr. D. Vijaya	M Sc, Ph D	Basic Medical Sciences (Biochemistry)	Female	Yes	Yes

The study is approved in its presented form. The decision was arrived at through consensus. Neither PI nor any of proposed study team members were present during the decision making of the IHEC. The IHEC functions in accordance with the ICH-GCP/ICMR/Schedule Y guidelines. The approval is valid until one year from the date of sanction. You may make a written request for renewal / extension of the validity, along with the submission of status report as decided by the IHEC.

PSG Institute of Medical Sciences & Research
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Following points must be noted:

1. IHEC should be informed of the date of initiation of the study
2. Status report of the study should be submitted to the IHEC every 12 months
3. PI and other investigators should co-operate fully with IHEC, who will monitor the trial from time to time
4. At the time of PI's retirement/intention to leave the institute, study responsibility should be transferred to a colleague after obtaining clearance from HOD, Status report, including accounts details should be submitted to IHEC and extramural sponsors
5. In case of any new information or any SAE, which could affect any study, must be informed to IHEC and sponsors. The PI should report SAEs occurred for IHEC approved studies within 7 days of the occurrence of the SAE. If the SAE is 'Death', the IHEC Secretariat will receive the SAE reporting form within 24 hours of the occurrence
6. In the event of any protocol amendments, IHEC must be informed and the amendments should be highlighted in clear terms as follows:
   a. The exact alteration/amendment should be specified and indicated where the amendment occurred in the original project. (Page no. Clause no. etc.)
   b. Alteration in the budgetary status should be clearly indicated and the revised budget form should be submitted
   c. If the amendments require a change in the consent form, the copy of revised Consent Form should be submitted to Ethics Committee for approval
   d. If the amendment demands a re-look at the toxicity or side effects to patients, the same should be documented
   e. If there are any amendments in the trial design, these must be incorporated in the protocol, and other study documents. These revised documents should be submitted for approval of the IHEC and only then can they be implemented
   f. Any deviation-Violation/waiver in the protocol must be informed to the IHEC within the stipulated period for review
7. Final report along with summary of findings and presentations/publications if any on closure of the study should be submitted to IHEC

Kindly note this approval is subject to ratification in the forthcoming full board review meeting of the IHEC.

Thanking You,

Yours Sincerely,

Dr S Bhuvaneshwari
Member-Secretary
Institutional Human Ethics Committee

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This is to certify that this dissertation work titled **ROLE OF MDCT(128 SLICE SCANNER) IN EVALUATION OF FOCAL PANCREATIC MASS LESIONS** of the candidate **DR.N.AISWARYA LAKSHMI** with registration number **201418101** for the award of **MASTER DEGREE** in the branch of **RADIODIAGNOSI**S. I personally verified the urkund.com website for the purpose of Plagiarism check. I found that the uploaded thesis file contains introduction to conclusion pages and result shows **2 %** of plagiarism in the dissertation.

Signature of the guide
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INTRODUCTION

Improvements in CT technology during the past decade, with fast image acquisition and improved spatial resolution, have increased the accuracy of CT for detecting different organ lesions including pancreas. With the advent of MDCT, pancreas can be very well imaged using high temporal resolution and the study can be done with a short breath hold. The advantages of MDCT are thinner slice collimation, near isotropic resolution and multiphasic imaging. Faster scanning times and shorter volume acquisitions allows for scanning during superior contrast enhancement of major vessels.

MDCT is the most efficient non invasive primary tool in the assessment of benign and malignant pancreatic lesions. It allows excellent visualization and detection of small and large pancreatic lesions and evaluation of peripancreatic structures. In case of pancreatic neoplasms , MDCT accurately depicts the tumor morphology, ductal anatomy, and its relationship to surrounding organs and vascular structures.

Endoscopic ultrasound (EUS) offers excellent visualization of the pancreas because of its close proximity to the transducer. High frequency transducer produces high resolution imaging of the variable pancreatic lesions. It also allows relatively easy access to the pancreas for tissue diagnosis using fine needle aspiration (FNA), thereby providing additional information and also regarding tumor staging.

AIM OF THE STUDY

AIM

- To determine the accuracy of MDCT (128 slices) in the evaluation of focal pancreatic mass lesions.
- To assess the efficacy of MDCT in characterizing the pancreatic lesions into cystic /benign /malignant.
- To assess the efficacy of MDCT in differentiating various pathological types of the pancreatic lesions.
- To determine the sensitivity and specificity of MDCT in diagnosing focal pancreatic mass lesions with clinical / biochemical / endoscopic / surgical / hitopathological / cytological findings as reference standards where it is applicable.

OBJECTIVE

PRIMARY OBJECTIVE:

- Document the effectiveness of MDCT in evaluating and characterizing various types of focal pancreatic lesions.

SECONDARY OBJECTIVE:

- Correlate the MDCT findings with endoscopic ultrasound findings where it is applicable.

- Correlate the MDCT findings with available surgical, cytological, histopathological findings & also follow up

MATERIALS AND METHODS

STUDY TYPE :

Prospective study, 42 patients with clinical findings / biochemical markers / ultrasound findings that are suggestive of pancreatic lesions were subjected to MDCT which was done with SEIMENS SOMATOM DEFINITION EDGE 128 SLICE SCANNER. Final MDCT diagnosis was compared with the endoscopic findings and with available surgical / histopathological / cytological findings to determine the efficacy of 128 slice MDCT in diagnosing and characterizing focal pancreatic mass lesions.

DURATION :

The duration of this study was from December 2014 to September 2017

INCLUSION CRITERIA :

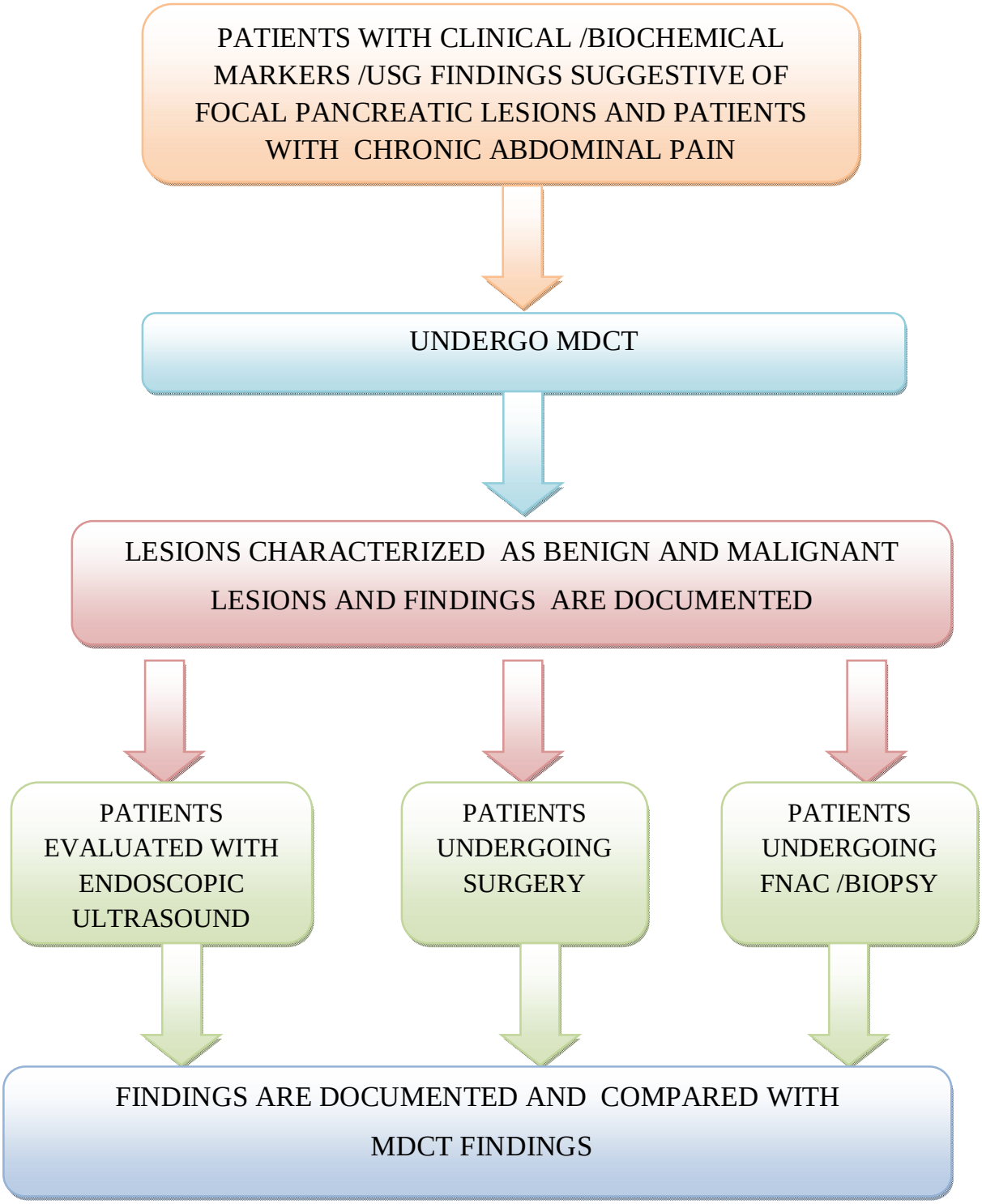
- Patients with clinical findings/biochemical markers/ultrasound findings that are suggestive of pancreatic lesions .
- Patients with chronic abdominal pain.
- Patients with incidentally detected pancreatic lesions.

- Patients who are capable of understanding the study constraints and confirm with the guidelines of informed consent.

EXCLUSION CRITERIA :

- Patients with absolute contraindication for contrast administration.
- Patients who are lost to follow up.
- Pregnancy.

STUDY DESIGN



STUDY PROTOCOL

IMAGING TECHNIQUE :

- MDCT is done with 128 slice multidetector CT (SIEMENS SOMATOM DEFINITION EDGE).
- Reassurance and brief explanation of the procedure is given to the patient.
- Precontrast scanning is performed from the level of diaphragmatic dome to the level of pubic symphysis.
- If oral contrast is used, it is given an hour prior to the procedure – 30 ml of 41.7% of Diatrozoate Sodium ionic contrast medium containing 250mg I/ml in 1litre of water
- If Iv contrast is used – 1 to 2 ml/kg of water soluble non-ionic contrast medium with iodine content of 300 -370mg at the rate of 4ml/sec.
- Images will be acquired at pre-contrast, post- contrast arterial, venous and delayed phases.

SCAN PARAMETERS:

- The scan parameters are tube voltage 120 kv; mAs.-automated tube current modulation.
- Raw data acquired at section thickness of 0.625mm

- Collimation:0.6mm
- Pitch:0.8 to 1.5
- Gantry rotation time:0.5s
- Table speed : 7.5 to 10mm per rotation during a single breath hold acquisition 15-25s
- Multislice CT allows examination of the pancreas with thin slice thickness(1mm) or less during a short time of a single breath hold with high quality images.
- Three phase protocol is obtained by bolus tracking and automated triggering technology.
- 1. Arterial phase (25 secs after the start of contrast injection),
- 2. venous phase (45 secs after the start of contrast injection)
- 3. Delayed phase (7 mins after the start of contrast injection)
- The source images are obtained initially following which volumetric reconstruction is done from the raw data at slice thickness of 5mm and 1mm in coronal and sagittal reformations for viewing in work station.

ENDOSCOPIC ULTRASOUND :

- It is performed using ALOCA endoscopic ultrasonography machine.
- Field of view: 360 degrees.
- Frequency: 7.5 to 12 MHz.
- It consists of an endoscopy with high resolution sonography.
- A sector type scanner is used to view the transverse and coronal views of the head of the pancreas from the duodenal bulb.
- Body,tail of pancreas,splenic vein and celiac trunk are visualized from the greater curvature of stomach.
- Examination time is 15 to 30 minutes.

DATA ANALYSIS:

MDCT is used to characterize the focal pancreatic mass lesions as benign and malignant , the findings of which are compared with the endoscopic ultrasound findings & fnac (where applicable) /surgery &histopathology (if surgery is done).

Sensitivity, Specificity, Positive, Negative predictive value & Diagnostic accuracy of MDCT(128 slice) in evaluation of focal pancreatic lesions are determined.

REVIEW OF LITERATURE

ANATOMY :

Pancreas is located in the region of epigastrium extending transversely from the duodenal loop to the splenic hilum at L1 level measuring about 15cm in length. It is lobulated in architecture. It comprises of head , uncinate process, neck, body and tail. It is predominantly a retroperitoneal structure except for the tail which is seen in the splenorenal ligament.

PARTS AND RELATIONS :

The head is located within the curve of the duodenum which is inturn overlapped by the pylorus of stomach and duodenal bulb in its upper surface.

Uncinate process projects posteriorly in relation to the superior mesenteric vessels. Rest of the pancreas lies in anterior relation to the inferior vena cava, renal veins, abdominal aorta and celiac artery.

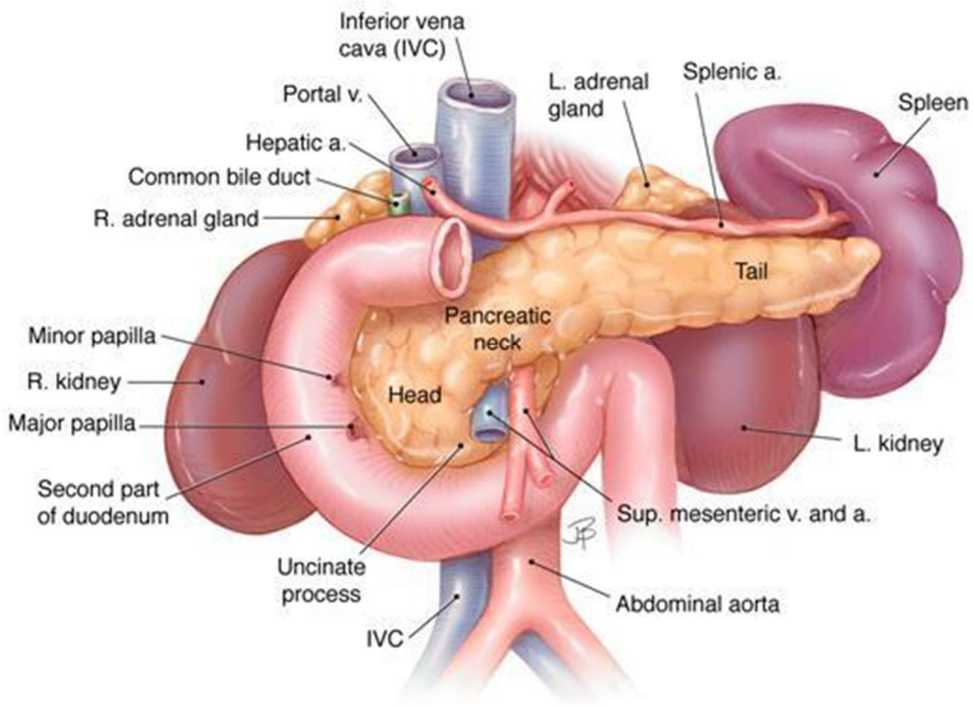
Neck of the pancreas lies anterior to the confluence of splenic and superior mesenteric vein joining to form the portal vein.

Body of the pancreas lies curving over the vertebra and reaches upto the left paravertebral gutter. Splenic vein and artery passes posterior to the body of pancreas. The body intrun lies anterior to the left kidney and adrenal gland.

Tail of the pancreas is seen in relation to the splenic hilum where it lies in the splenorenal ligament. Lesser sac is seen anterior to the pancreas and further anterior lies the stomach.

The main pancreatic duct is located in the anterior part of the pancreas. It joins the common bile duct and drains into the ampulla of vater. The accessory duct of santorini arises from the head of pancreas and drains finally into the minor papilla located in the duodenum , approximately 2cm from the ampulla of vater.

FIG1: **ANATOMY OF PANCREAS**



ARTERIAL SUPPLY :

Arterial supply of the pancreatic head is from the superior pancreaticoduodenal artery and inferior pancreaticoduodenal artery which are in turn branches of gastroduodenal artery and superior mesenteric artery respectively. Rest of the pancreas is supplied by the splenic artery through multiple direct small branches and arteria pancreatica magna. It can also supplied by dorsal pancreatic artery which is a branch of either celiac or splenic artery.

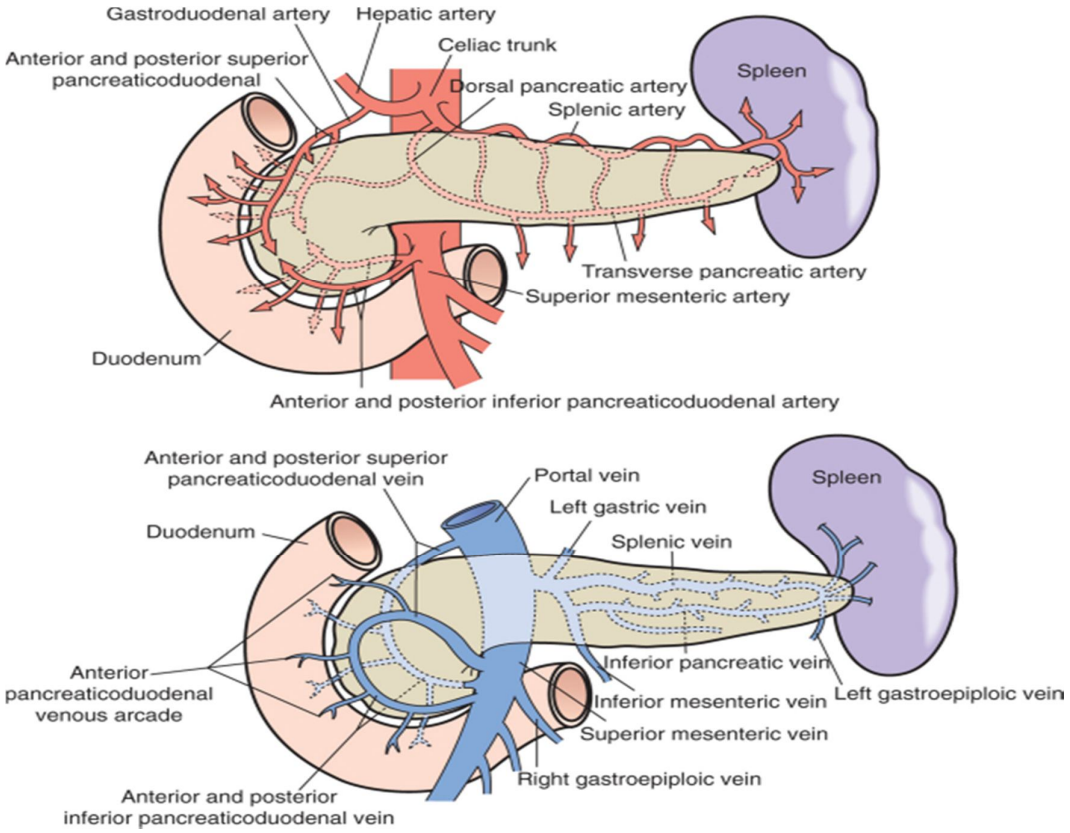
VENOUS DRAINAGE :

Venous drainage of pancreas is into the superior mesenteric vein and portal vein from the pancreatic head and into the splenic vein from the rest of the pancreas.

LYMPHATIC DRAINAGE :

The lymphatic drainage of the pancreas is into the nodes which are located along the course of supplying arteries. Finally draining into the preaortic celiac nodes

FIG 2 :ARTERIAL SUPPLY AND VENOUS DRAINAGE OF PANCREAS



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EMBRYOLOGY OF PANCREAS :

Pancreas develops from the junction of primitive foregut and midgut. There is large dorsal division and two small ventral buds that arises commonly with the biliary duct. Left ventral bud generally atrophies whereas the right ventral bud turns posteriorly to unite with the inferior portion of the dorsal division.

RADIOLOGICAL FEATURES OF PANCREAS :

PLAIN ABDOMINAL RADIOGRAPH :

Pancreas is not normally visible in abdominal radiograph unless calcified. When the calcification is seen distributed throughout the pancreas , it is seen as a transverse structure extending at the level of L1.

ULTRASONOGRAPHY :

Echotexture of the pancreas is seen homogenous normally, slightly hyperechoiec or isoechoiec to liver. Obesity and ageing causes pancreas to become hyperechoiec due to the varying amounts of fat. Entire pancreas is visualized only in 60% of studies otherwise where it will be obscured by overlying stomach and transverse colonic gas. In transverse sections pancreas is seen anterior to the splenic vein. Just above the pancreas, the celiac artery divides into splenic and hepatic arteries. Bile duct is seen cephalad to the pancreatic head. Pylorus and duodenum are seen curving the head of pancreas

on the right side. Head and neck of pancreas are present in the midline, seen anterior to the confluence of splenic and superior mesenteric veins. Uncinate process is seen posterior to the superior mesenteric vessels.

Body is seen anterior to the splenic vein across the midline.Tail of the pancreas is viewed by oblique views through the spleen. Main pancreastic duct is seen in the anterior surface of the pancreas. Normally seen in about 80% of the cases. It measures about 3mm in the head region, 2mm in the body and 1.5mm in the tail region

COMPUTED TOMOGRAPHY :

Because of the oblique location of the pancreas , entire parenchyma is seen in sequential CT images. Tail is seen at the highest slice, at the level of splenic hilum whereas uncinate process is seen at the lowest level. Normally the head of pancreas is 2 cm in thickness, neck is about 0.5 to 1cm in thickness, body and tail are 1-2cm in thickness. Craniocaudal dimension of the pancreas at the level of head is 8cm, whereas body and tail measures 3-4cm. Pancreatic duct is seen in most of the cases. Common bile duct is seen at the pancreatic head. Portal vein formation happens behind the neck of pancreas. Mesenteric vessels are seen anterior to the uncinate process.

MRI OF PANCREAS :

Pancreas has shortest T1 among the various abdominal organs, thereby seen appearing hyperintense on T1 weighted images. It is also well seen in T2

weighted images. Pancreas is highly vascular and intensely enhances in the arterial phase after giving gadolinium bolus. MRCP depicts normal ductal anatomy as well as congenital anomalies. Normal pancreatic duct measures 2mm in thickness. Numerous side branches are seen draining from the lobules in the pancreatic parenchyma into the duct.

ENDOSCOPIC ULTRASOUND:

Various methods are used to evaluate pancreas. CT and MRI are non-invasive methods for detailed imaging of pancreas and the structures that are surrounding the pancreas within the abdominal cavity. Endoscopic ultrasound enables the physician for getting in a close proximity and thereby detailed imaging of the entire pancreatic parenchyma. There are two approaches for examining the pancreas, namely the transgastric and trans duodenal approach. Pancreatic head is well visualized by means of transduodenal approach. Pancreatic body and tail are viewed with transgastric approach.

IMAGING FEATURES OF FOCAL PANCREATIC MASS LESIONS :

PANCREATIC ADENOCARCINOMA :

It is the most common tumour of the pancreas which comprises about 75-90 % of all the pancreatic neoplasm. It is mostly ductal in origin commonly affecting middle aged and elderly people. Twice as common in males as in females.

Risk factors are cigarette smoking, high intake of animal fat, alcohol hereditary pancreatitis. 99 % of the tumours are seen arising from the exocrine ductal epithelium with histological feature of schirrhous nature. Jaundice is the main complaint in those patients with tumours involving the pancreatic head whereas pain and weight loss are the features in those patients with tumours involving the body and tail regions.

IMAGING:

Imaging in case of pancreatic tumour involves both diagnostic and staging purposes. Various imaging modalities have evolved for evaluation of pancreatic tumours. MDCT has a role in producing submillimeter imaging.

ULTRASONOGRAPHY :

Pancreatic tumours are usually hypoechoiec when compared to the normal pancreatic parenchyma. Whenever there is necrosis within the tumour, the echopattern will be heterogenous. Ductal dilatation and obstruction can also be seen. Vascular involvement is seen as periarterial thickening of the fat.

COMPUTED TOMOGRAPHY :

It is now the widely used imaging technique and considered the imaging modality of choice for evaluating patients with neoplastic pancreatic lesions. Multidetector row CT scanners help us in evaluating wide variety of pancreatic pathologies. There is narrow collimation as well as faster scanning technique

which helps in detecting pancreatic tumurs with much more accuracy. Pancreatic adenocarcinoma are usually hypoenhancing compared to the normal pancreas, thereby helps in easy detection.

ENDOSCOPIC ULTRASOUND:

It is highly sensitive for detecting small lesions which are solid and less than 2cm. Extent of arterial involvement can have limited visualization. Typical pancreatic ductal carcinoma presents as a hypoechoiec mass with irregular margin, often seen obstructing the pancreatic duct. It is hypovascular compared to surrounding pancreatic parenchyma. Other disadvantages are EUS is an invasive procedure that requires sedation and highly operator dependant. The main advantage of EUS lies in the ability for tissue sampling. EUS FNAC is highly safe and reliable also which even improves the accuracy of non invasive imaging modality like CT.

MRI :

Detection of malignant lesions are best performed with T1 weighted fat suppressed images and contrast enhanced T1 weighted images. Normal pancreas shows increased signal intensity on T1 weighted images and shows intense enhancement during the arterial phase after IV gadolinium administration.

Pancreatic malignant lesions are desmoplastic in nature and appear hypointense to the pancreatic parenchyma on T1 weighted images. After

administration of contrast, the lesion becomes hypo to isointense on parenchymal and portal venous phase. The tumour can also obstruct the ductal system which will appear beaded with smooth margin and outline.MRI also helps in differentiating focal infiltration of fat in the pancreas from the tumour.

STAGING OF PANCREATIC TUMOUR:

In general the local spread in case of pancreatic carcinoma can be determined by means of assessing the site of origin. Lesions in the anterior pancreatic head grow towards and involves the gastroduodenal and hepatic arteries. Lesions in the posterior aspect of the pancreatic head involves the superior mesenteric vein and portal veins. Uncinate process tumours involves the inferior pancreaticoduodenal artery.

TNM staging is used for staging pancreatic carcinoma.

Tx :Primary tumour cannot be assessed.

T0: No evidence of primary tumour.

Tis: Carcinoma in situ.

T staging : T1 - Size of the lesion < 2cm confined to the pancreas

T2 - Size of the lesion > 2cm confined to the pancreas.

T3 - Tumour extends beyond the pancreas and involves the peripancreatic soft tissue without involving the celiac axis, Superior mesenteric artery and stomach

T4 - Tumour involves either celiac axis or superior mesenteric artery.

N staging : Nx : Regional lymphnodes cannot be assessed.

N0 : No regional lymphnode metastases.

N1 : Regional lymphnode metastases.

M staging : M0 : No distant metastases.

M1 : Distant metastases.

Regional lymphnodes includes peripancreatic which are proximal mesenteric and bile duct nodes. The nodes to get involved in pancreatic head tumours are pyloric and celiac group whereas splenic hilum and pancreatic tail region nodes are involved in pancreatic body and tail tumours.

VASCULAR RESECTABILITY :

Assessment of involvement of the arterial and venous structures by the malignant lesions are important as their involvement makes the tumour unresectable.

UNRESECTABLE TUMOURS :

If the lesion is involving and encasing the hepatic artery, proximal gastroduodenal artery, celiac axis and superior mesenteric artery then it becomes unresectable.

Circumferential venous involvement brings a tear drop mesenteric vein sign which makes the lesion unresectable.

Patients with locally advanced disease or disseminated disease are treated by palliative means who are not the candidates for resection or surgical palliation. Endoscopic stenting with ERCP is done for palliation of jaundice.

BENIGN AND CYSTIC LESIONS OF PANCREAS :

PSEUDOCYST :

The common non –neoplastic cystic lesion of pancreas is the pseudocyst. It is described as a circumscribed fluid collection that contains pancreatic enzymes. These cysts are named so because they do not have typical epithelial lining. Psuedocyst generally occur as a sequelae to pancreatitis or following trauma.It takes about 4 weeks for the development of a wall around these cysts.Main pathophysiology behind the formation is continuous leak of the pancreatic juice because of separation of main pancreatic duct or at times its side branches in the absence of necrosis in the pancreatic parenchyma.

IMAGING :

These cysts are unilocular with a regular well defined wall. Rim of calcification may or may not be seen.Associated features of pancreatitis can also help in diagnosing pseuodcyts.Secondary infection within the pseudocysts can happen which can be seen in the form of presence of gas within the cysts or when they develop enhancing thick walls. Internal debris and also communication with the main pancreatic duct may or may not be seen. These cysts doent have malignant potential. Fluid within the cyst may be hemorrhagic and turbid. Amylase concentration within the cyst fluid is more than 250U/L.

SEROUS CYSTADENOMA :

Serous cystic lesions are more common in females seen between 6-7th decade of life. Also referred to as “GRAND MOTHER “ lesions.

IMAGING :

These cysts are microcystic with thin walls separated by thin internal septations. Each cyst measures less than 2cm and they will have more than 6 cysts. These lesions can occur anywhere in the pancreas. Only about 30 % of the cases will have central fibrous scar or sunburst type of calcification which are pathognomonic.

ULTRASOUND :

These lesions appear as solid echogenic masses due to numerous interfaces produced by numerous cysts which are microscopic in nature. It can also appear as a multilocular cyst or lesion with mixed solid and cystic componenets. Some lesions can also have posterior acoustic enhancement due to the content of the fluid.

COMPUTED TOMOGRAPHY:

Serous cystadenoma will appear hypodense on unenhanced CT. They are near water attenuation lesions with presence of central calcifications. Central scar that is of stellate type can show calcification seen in around 20 % of the lesions which is one of the characteristic feature of serous cystdenoma. These lesions are hypervascular in nature. Delayed images can show enhancement of the septations giving a swiss cheese or honeycomb appearance because of presence of numerous cysts. The main characteristic feature of serous cystadenoma is the presence of cysts around a fibrous central scar in a sunburst pattern with coarse calcification.

Other usefulness of CT is to exclude metastases and invasion into adjacent structures and to confirm the benign nature of the lesions

MRI :

On MRI, these lesions will have a lobulated margins with thin wall, homogenous appearance of each locule on T1 weighted images and typical location in the head of the pancreas favours the diagnosis. These lesions have high signal intensity on T2 weighted images with a classical cluster of grapes appearance. The septa on T2 weighted images appear as dark thin strands. Serous cystadenoma are hypervascular that is secondary to a rich subepithelial capillary network.They also have a tendency for hemorrhage. Calcifications are not very well demonstrated on MR compared to CT. These tumours typically are benign and rarely undergoes malignant transformation. The growth rate of these lesions is around 1-4mm per year on an average, recommending follow up in case of a symptomatic patients. If at all malignant transformation happens, the points favouring it are presence of solid component with enhancement and lymphadenopathy in retroperitoneal location.

Fluid shows clear fluid which is non-mucinous in nature , high glycogen levels, low amylase and CEA levels are other features.

MUCINOUS CYSTIC NEOPLASMS:

This group consists of mucinous cystadenomas and mucinous cystadenocarcinomas. Mucinous cystic neoplasms are rare constituiting about 2.5 % of the exocrine tumours of pancreas. These lesions of pancreas are

exclusively seen in females especially in 4th to 5^{th} decade. They are referred to as " MOTHER" lesions.

Common location is either body or tail of the pancreas. They are oval shaped and have thick walls. Usually multilocular and macrocystic – measuring more than 2cm in size with less than 6 number of cysts. Occasionally these cysts can be unilocular and may contain internal debris or hemorrhage within. These cysts normally do not communicate with the main pancreatic duct which helps in distinguishing them from IPMN especially the side branch type. The fluid present within these lesions are usually thick, highly rich in mucin content and more viscous in nature. Amylase concentration is quite variable whereas CEA levels are more than 192 ng/ml.

Malignant transformation of these cyts can be predicted by means of presence of peripheral calcifications, irregularly enhancing walls and presence of solid components. The most important histological feature in mucinous cystic lesions are presence of unique variety of ovarian type stroma that is not seen in other pancreatic lesions.

IMAGING :

ULTRASONOGRAPHY:

Mucinous cystic neoplasm are typically mutilocular large lesions measuring ~ 10cm with presence of anechoiec cavities showing posterior acoustic enhancement.

Can be unilocular with well-defined borders , usually have smooth external surfaces. Occasionally can have echogenic debris, internal septations and papillary excrescences.

COMPUTED TOMOGRAPHY :

On unenhanced CT, these lesions appear round to mildly lobulated mass lesion with well encapsulated and smooth external margins. There can be capsular or septal calcifications in about 10 -25 % of cases. Post contrast images will demonstrate wall enhancement with presence of thin septations.

MRI :

The signal characteristics of the lesion can be variable based on the cyst fluid contents. simple fluid shows hypointense signal on T1 weighted images. Hemorrhagic or proteinaceous fluid shows hyperintense signal on T2 weighted images.On T2 weighted images , the internal septations will show low signal intensity. One of the differential diagnosis is pseudocyst in case of a unilocular lesion, Absence of radiological features of acute or chronic pancreatitis, presence of normal pancreatic parenchyma adjacent the cyst., lack of communication with the main pancreatic duct of the cyst, presence of solid component within the cystic mass favours the diagnosis of mucinous cystic neoplasm.

INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM :

These lesions are characterized by the cystic dilatation of the duct of pancreas occurring because of over production of mucin. More commonly seen in elderly males between 6-7th decade.These lesions are sometimes referred to as "GRANDFATHER " lesions. It has three types namely Main duct type (MD), branch duct type (BD) and mixed type. Main duct type otherwise known as primary IPMN arises from the main pancreatic duct. Branch type otherwise known as secondary IPMN arises from the side or secondary branches. Mixed type involves both the main pancreatic duct and side or secondary branches.

MAIN DUCT TYPE:

In main duct type, the main pancreatic duct will be dilated more than 5mm either diffuse or segmental without any history of pancreatitis. There will also be dilatation of the major and minor papilla with bulging of the main pancreatic duct into the duodenal lumen rendered to as bulging papilla sign. Malignant transformation is predicted when the main duct measures more than 10mm in diameter with presence of enhancing nodules within, abrupt change in the caliber of the pancreatic duct with associated distal pancreatic atrophy , associated lymphadenopathy. The malignant transformation chance in case of IPMN is around 60-92%. Primary IPMN should always be differentiated from chronic pancreatitis. The features which differentiate main duct type IPMN from chronic pancreatitis are presence of dilatation of the duct without

stricture, bulging papilla sign, grape like appearing cysts, nodule within the cysts. Rarely erosion can happen with eventual fistula formation into the bile duct, duodenum and stomach.

BRANCH DUCT TYPE:

This type of IPMN can involve any part of the pancreas but predominantly seen in the uncinate process. They can have either a microcystic or macrocystic appearance, macrocystic being more common. Macrocystic variety can either be unilocular or mulitilocular. Microcystic has multiple thin septa resembling serous cystadenoma where the main differentiating feature is communication with the main pancreatic duct. Malignant transformation chance is about 6- 40% which can be predicted when the thickness of the cyst wall has increased, or when the cyst wall shows enhancement after administration of contrast, presence of mural nodules and when the size of the cyst exceeds 3cm and caliber of main pancreatic duct exceeds 9mm.

IMAGING :

ULTRASONOGRAPHY:

Cystic pancreatic mass with dilatation of the duct or presence of intraductal echogenic contents due to mucin .In case of branch duct type, lesion will be seen in pancreatic head or uncinate process as a lobulated hypoechoiec mass.The differential dilemma for IPMT branch duct type is cystic neoplasm of pancreas which can be differentiated with the help of clinical history,

imaging features, presence of intraductal filling defect, main duct communication.

MR CHOLANGIOGRAPHY:

It plays an important and excellent role in imaging and characterization of IPMT. Extent of ductal involvement and communication of the cyst with the ductal system are visualized well with MRCP. Suspicion of malignancy occurs when the main pancreatic duct diameter exceeds 10mm, presence of mural nodules, presence of papillary projections, presence of vascular involvement, metastases, peripancreatic lympadenpathy. Total resection is the treatment of choice.

ENDOSCOPIC ULTRASOUND :

It is one of the useful modality for differentiating benign and malignant variety of IPMT. Features suggesting malignancy are main duct type tumours with the dilatation of main pancreatic duct equal or more than 10mm, branch duct type tumours measuring equal or more than 40mm with presence of irregular septations, presence of large mural nodules measuring more than 10mm in size.

REVIEW OF LITERATURE

A study by **Hossain MS, Saha PP et al** [(1)]including 47 patients using a 16 slice multi detector CT multi slice showed that pancreatic lesions were more common in males (78.7%) than females (21.3%). About 63.8% of tumors was seen in the head of the pancreas, 17% involved the body of pancreas and 6.4% of the lesions involved the tail of Pancreas. He also stated that the commonest age group among the patients was 56-65 yrs (53.2 %) followed by 66-75 yrs age group (25.5%) patients. This study resulted in a sensitivity of about 87.5% in evaluation of pancreatic mass lesions. The specificity was 66.6%, Positive predictive value was 84.8%, Negative predictive value was 71.4% and diagnostic accuracy was 80.8%. About 63.8% of tumors was seen in the head of the pancreas, 17% involved the body of pancreas and 6.4% of the lesions involved the tail of Pancreas.

Study by **Jemal et al** [(2)]stated that pancreatic lesions were more common in males 78.7% than in females 21.3 .He also found that age 60-80 years are the most affected group with pancreatic neoplasm and uncommon in those younger than 40 years

Becher and Stommer et al [(3)] stated that 60% of pancreatic tumors were found in the head of pancreas, 10% in the body of pancreas , about 5% in the tail and the remaining 25% were diffusely involved.

Scaglion et al [4] reported sensitivity of MDCT as high as 90 to 97% in the detection of pancreatic malignant masses. The accuracy of staging pancreatic malignant lesions was 93% and positive predictive value was between 89 -100% for detecting surgical unresectability. Pancreatic ductal adenocarcinoma accounts for 80-90% of all pancreatic tumours and mainly located in the pancreatic head region. The average size of those lesions located in the head region was 2-3cm.

Chaudhari et al and colleagues [5]concluded an accuracy of 71–80% for MDCT for discriminating malignant pancreatic lesions from benign lesions. In his study totally 100 lesions were included, out of which 62 were related to tumour and 38 lesions were not related to tumour. The lesions were classified as benign and malignant which was also finally classified as serous lesions ,mucinous and other types of lesions. The accuracy rate was 83-92% and 85-91% for two different reviewers for classifying lesions into those related to tumours and those related to cysts. Specificity was 66-88% and 84% for the two reviewers.

In a study by **Mahmoud Abdelaziz Dawoud et al** [6] and colleagues which included 20 patients with pancreatic masses, 16 were males and 4 were females, age ranged from 30-70 years with a mean age of 58 years. The patients underwent contrast enhanced mutislice CT (16 slice machine) and the results were compared with histopathology and operative data. Pain is the most common complaint as observed in this study accounting for about 60% among

the examined patients. In this study among the selected 20 patients, multislice CT had a sensitivity of 97.7 % in detecting pancreatic lesions. Pancreatic neoplasms were found to be more common in males 80% than females 20%. In this study the age group mostly affected by pancreatic neoplasm was 60–70 Years. This study also showed that Adenocarcinoma as reported by pathological studies was the most common pathological finding in about 40% of the patients. A total of 14 (70%) patients with pancreatic cancer had unresectable tumors and 6 (30%) patients had tumours that were resectable ,the causes were hepatic metastasis, vascular invasion , distant lymph nodes involvement and ascites.

Study by **Eun sun lee, Jeong min lee at al** [7] showed MDCT showed the best performance for evaluation of vascular invasion that is the most important factor for determining the tumour respectability. The sensitivity, specificity and positive predictive value were 100%, 72% and 89 % respectively. For detecting and staging adenocarcinoma, sensitivity of MDCT was 90%.

Koelblinger et al [8] compared multiphasic CT (64 detector row) and gadobenate dimeglumine enhanced MR (3T) for prospectively evaluating those patients who were suspected to have pancreatic cancer.Multidetector CT and MRI were performed in about 89 patients among them 48 were women and 41 were men. The readers assessed for the presence of focal pancreatic mass lesions, about their vascular invasion and metastases. Finally biopsy, surgery

,endoscopic ultrasound and follow up images were used for standard reference. Focal pancreatic mass lesions were seen in 63 patients among whom 43 had adenocarcinoma. He determined that 64 detector row CT had a sensitivity of 98%, specificity of 96% for detection of pancreatic cancer. Vascular invasion was seen in 22 patients yielding a sensitivity of 90 % and specificity of 98%.

Study by **Rosch T et al** [9] showed that EUS alone has disappointing accuracy of about 76% for detecting pancreatic cancer. A total of 132 patients were included who were examined with ultrasound (transabdominal), endoscopic ultrasound (EUS), computed tomography (CT) and ERCP. Finally 102 pancreatic malignant lesions were diagnosed. The sensitivity and specificity of CT was 77 % and 53% respectively. Endoscopic ultrasound has a sensitivity and specificity of 99% and 100%.But this was for small pancreatic tumours measuring 3cm or less. Endoscopic ultrasound was not able to reliably differentiate malignant from inflammatory pancreatic masses.

Ardengh JC Et al [10] detected accuracy of conjoined EUS-FNAC for detecting pancreatic malignancy with the sensitivity exceeding 90% . A total of 611 patients were subjected to endoscopic ultrasound and fine needle aspiration cytology. Those patients had 405 solid pancreatic tumours, 189 lesions were cystic and 17 were mixed. Cytological assessment was obtained by means of endoscopic ultrasound guided fine needle aspiration cytology in 595 cases. out of which 352 were malignant and 259 were benign. Pancreatic adenocarcinoma accounted for about 67% of the malignant lesions. The sensitivity, specificity,

positive, negative predictive values and accuracy of EUS- fine needle aspiration cytology were 78.4%,99.2%,9.3%,77.2% and 87..2% respectively for solid tumours and 72.2%,99.3%,97.5%,91% and 92.2% respectively for cystic tumours.

Atanas D Hilendarov et al (11) did a study including 56 patients with cystic pancreatic lesions where diagnostic accuracy of ultrasound and MDCT examination and that of hitological confirmation lead to rue positive results in 31 patients, true negative was seen in 11 patients, false positive results were seen in 5 patients and false negative results in 9 patients. Finally sensitivity, specificity, positive predictive and negative predictive values were 79.48%, 68.75%, 86.11% and 55% respectively was obtained.

Dushyant.v.sahani et al and colleagues [(12)] conducted a study in about 114 patients having 130 cystic lesions in the pancreas and reported that MDCT had an accuracy of about 56-85% for evaluating and characterizing cystic lesions of pancreas. He also found that MDCT had an accuracy of 82-85% in differentiating mucinous from non-mucinous types of cystic lesions and accuracy of 85-86% for describing aggressive morphological features. sahani et al also described that MDCT had a sensitivity of 93.6% for detecting septa within the lesions, sensitivities of 71.4% for detecting mural nodules and 86.4 % for detecting communication with the main pancreatic duct. For lesions less than or equal to 3cm, MDCT had a sensitivity of 73.9% for detecting the

presence of septa and 86% for detecting the communication with the main pancreatic duct.

Sainani et al [13] described that MDCT had a sensitivity of 86% for differentiating non mucinous and mucinous types of cystic lesions. It was a prospective study which included 63 patients (26 males and 37 females) who had 83 cystic lesions. All these patients underwent 16 –MDCT with surgical exploration and following which pathological features were also evaluated. He also characterized lesions as benign and malignant. Pathologically 54 lesions were benign, 29 lesions were malignant. 58 lesions were mucinous whereas 21 were nonmucinous. Among the non-mucinous lesions, 12 were benign cysts, 4 were serous cystic neoplasms and 1 lesion was solid pseudopapillary neoplasm. MDCT had an accuracy of 76% for predicting malignancy.

Visser et al and colleagues [14] in their study reported the accuracy of MDCT and MRI in characterizing cystic pancreatic lesions. Total of 58 patients with histopathologically proven pancreatic cystic lesions underwent CT and MRI. Among the 58 patients , 21 patients had malignant lesions. Finally they found that the sensitivity of MDCT was about 76-82% in diagnosing malignant lesions of pancreas.

Lee et al [15] and colleagues reported the accuracy of MDCT and MRI for differentiating benign and malignant pancreatic lesions and thereby suggesting specific diagnostic criteria for pancreatic cystic lesions. Totally 63

patients were included who underwent both MDCT and MRI. This study concluded that the accuracy of MDCT was 63.9 to 73.5% for differentiating benign and malignant cystic lesions of pancreas. They also concluded that MDCT and MRI had equivalent accuracy for differentiating and characterizing benign and malignant cystic lesions of pancreas.

In a study by **M Arabul, et al**[16], including 56 patients , a prospective trail was conducted to compare MDCT and Endoscopic ultrasound in evaluating benign and malignant pancreatic lesions and secondly to determine vascular and local invasion of a malignant pancreatic lesion thereby deciding the resectability. He found that in assessing vascular invasion, the sensitivity and specificity for MDCT were 80%-88% and 78%- 83%, respectively and for EUS were 50%-56% and 83%-89%, respectively. For assessing local invasion , MDCT was found to be better considered to EUS. For assessing the resectable nature of the tumour, MDCT had a sensitivity and specificity for MDCT was 93 % and 83% respectively and for EUS, sensitivity and specificity were 50% and 86% respectively resulting in a significant correlation between MDCT and EUS ($r=0.63$, $p<0.0001$). After including all pancreatic masses for the detection of malignancy, sensitivity and specificity for MDCT were 93% and 88% respectively for MDCT, and for EUS was 98% and 75%, respectively.

Binit sureka at al and collegues [17] conducted a research between January 2010 to April 2016, they classified pancreatic cysts into neoplastic and non-neoplastic and also they studied the imaging morphology of pancreatic cysts. In their study they found that MDCT had a sensitivity of 56 -85% for characterization of cystic pancreatic lesions

Peijie et al and collegues [18] analysed the role of CT in differentiating pancreatic ductal adenocarcinoma from mucinous cystadenoma, serous cystadenoma and pseudocyst. Among the 88 patients, 26 patients had SCN, 20 patients had MCN,23 patients had pseudocysts and 19 patients had PDAC. All the patient underwent CT and the results were compared with cytological analysis. Cytological examination : Presence of cuboidal epithelial cells with cytoplasmic glycogen are diagnostic of serous cystadenoma. Epithelial cells containing cytoplasmic mucin is diagnostic of mucinous cystadenoma. Pseudocyst had presence of histiocytes and acute inflammation. Presence of immunohistochemical markers were seen in pancreatic adenocarcinoma which are CEA, MUCI ,MUC6, P53, MUC5AC.They finally found that the sensitivity and specificity of MDCT in differentiating PDAC from SCN, MCN and pseudocysts based on CT and cytological findings were 74 % and 75% respectively.

Jenssen et al [19] in his study described the role of endoscopic ultrasound in detecting and characterizing solid pancreatic lesions.He found that endoscopic ultrasound imaging is an added supplementary to computed

tomography , the accuracy being 90 % for differentiating beingn and malignant solid pancreatic lesions. For detection of arterial invasion in case of malignant lesions endoscopic ultrasound has a similar accuracy compared to computed tomography. The accuracy of EUS – guided fine needle aspiration was found to be 90% for diagnosing malignant pancreatic lesions..

Legmann paul et al [20]and colleagues compared CT (dual phase helical) and endoscopic ultrasound for diagnosing as well as staging the pancreatic tumours. Totally 30 patients underwent both dual phase helical CT and endoscopic ultrasound and finally pathological diagnosis was obtained in cases who underwent surgery and biopsy that resulted in 27 cases of pancreatic malignant tumours. Finally the findings of CT and endoscopic ultrasound were correlated with surgical along with pathological findings for determining the sensitivity of diagnosis and tumour respectability. The diagnostic accuracy for CT was 92% and 100 % for endoscopic ultrasound..Main difference in detection of tumour was for those lesions smaller than 15mm where the sensitivity for endoscopic ultrasound was 100% and for dual phase helical CT was 67 % but dint have any statistical difference. For lesions between 15 and 35mm size and more than 35mm size, both endoscopic ultrasound and CT had equal accuracy and sensitivity which was 100 %. For staging the pancreatic tumours , the accuracy was 93% for CT and endoscopic ultrasound. The sensitivity for detecting unresectability was 100 % for CT and 86 % for endoscopic ultrasound. Specificity for tumour exclusion was found to be 33%

in case of endoscopic ultrasound and 100 % for double phase helical CT. Finally they concluded that CT (dual phase helical) and endoscopic ultrasound do not have significant difference in diagnosing and assessing the pancreatic tumour resectability as the overall accuracy was 93% for both CTand endoscopic ultrasound. Positive predictive value for CT was 100 % and for endoscopic ultrasound was 93%. Negative predictive value for CT was 60% and for endoscopic ultrasound was 100%. For detection of tumour the accuracy overall was found to be 100 % when both the imaging modalities were combined.

Rafique et al and colleagues [21] studied the appearance of pancreatic lesions in both MDCT and endoscopic ultrasound and also highlighted the advantages and complementary role of each modality in characterizing benign and malignant lesions of pancreas. They found that MDCT was excellent in determining and evaluating non resectable tumours and for accurately staging the pancreatic malignancy. MDCT has improved spatial resolution, able to generate multiplanar reconstructions and along with fast aquisition time allows optimal visualization of vascular anatomy thereby helping in detecting pre-operative resectability with regards to the vascular (both arterial and venous) involvement. Endoscopic ultrasound performed by experienced operators plays a role in case of lesions not detected on CT. Endoscopic ultrasound can detect the vascular involvement and predict the resectability especially in lesions less than 3cm.

Agarwal et al and colleagues [22], evaluated the conjunct use of endoscopic ultrasound and Fine needle aspiration cytology for suspicious pancreatic cancer retrospectively in 81 consecutive patients. He detected that improvement in the CT scanners with better and higher resolution and the ability for reconstructing 3D images, has lead to accept CT as a better tool for pancreatic cancer staging. CT is also more readily available. They found that the accuracy of spiral CT, EUS and FNA were found to be 74%, 94% and 88 % respectively. Cytological analysis using FNA specimens provided an accuracy of 89% in identifying malignancy in those suspicious lesions detected on endoscopic ultrasound.

OBSERVATION AND RESULTS

In this study 42 patients were evaluated with MDCT, following which the findings were compared with endoscopic ultrasound findings and EUS guided Fine needle aspiration cytology..

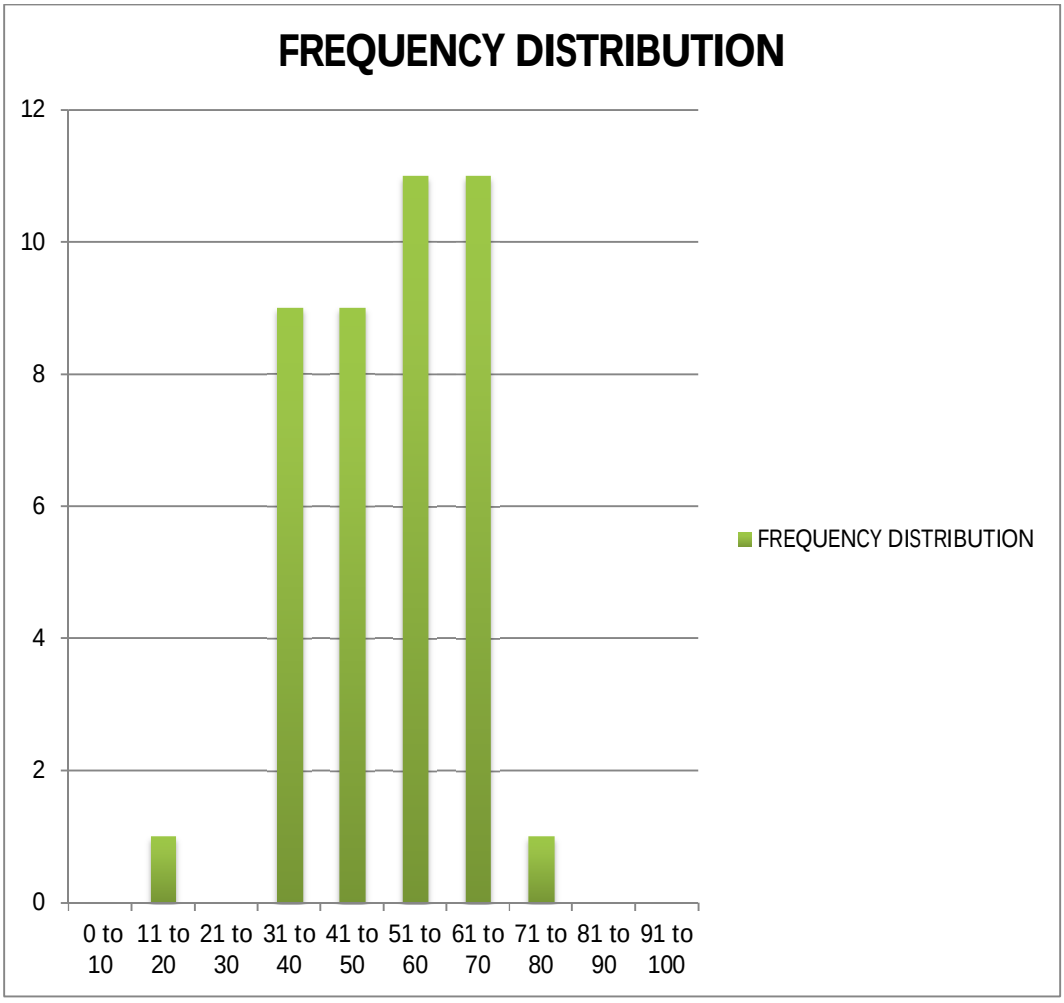
AGE DISTRIBUTION OF PATIENTS

TABLE 1 SHOWING THE AGE DISTRIBUTION OF THE PATIENTS :

AGE GROUPS (Years)	FREQUENCY	PERCENTAGE %
0 to 10	0	0
11 to 20	1	2
21 to 30	0	0
31 to 40	12	29
41 to 50	7	17
51 to 60	10	24
61 to 70	11	26
71 to 80	1	2
81 to 90	0	0
91 to 100	0	0
TOTAL	**42**	**100**

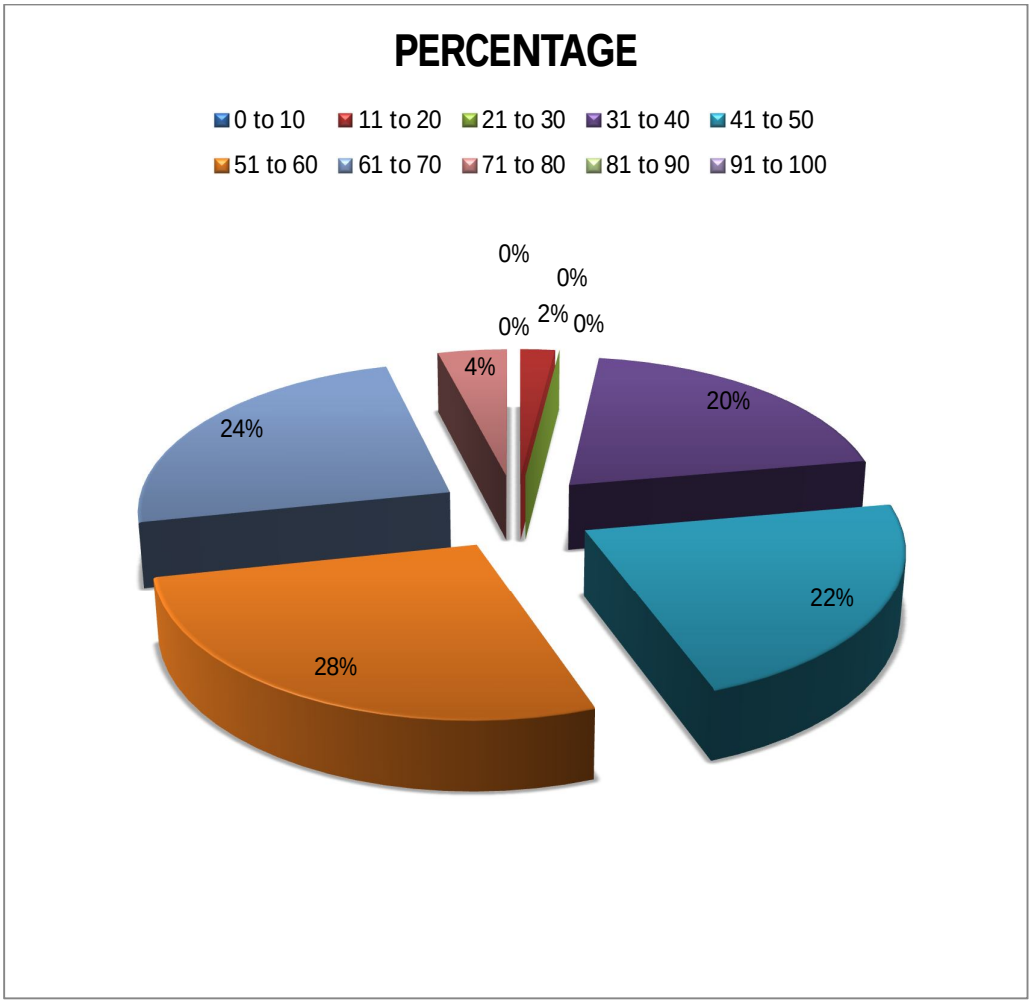
The above table shows the age distribution of the total study population

FIGURE 3: FREQUENCY DISTRIBUTION OF AGE GROUP OF THE STUDY POPULATION



The bar chart shows the frequency distribution of age of the total study population.

FIGURE 4: PERCENTAGE DISTRIBUTION OF STUDY POPULATION IN AGE GROUPS



Pie chart showing the percentage distribution of age of the total study population.

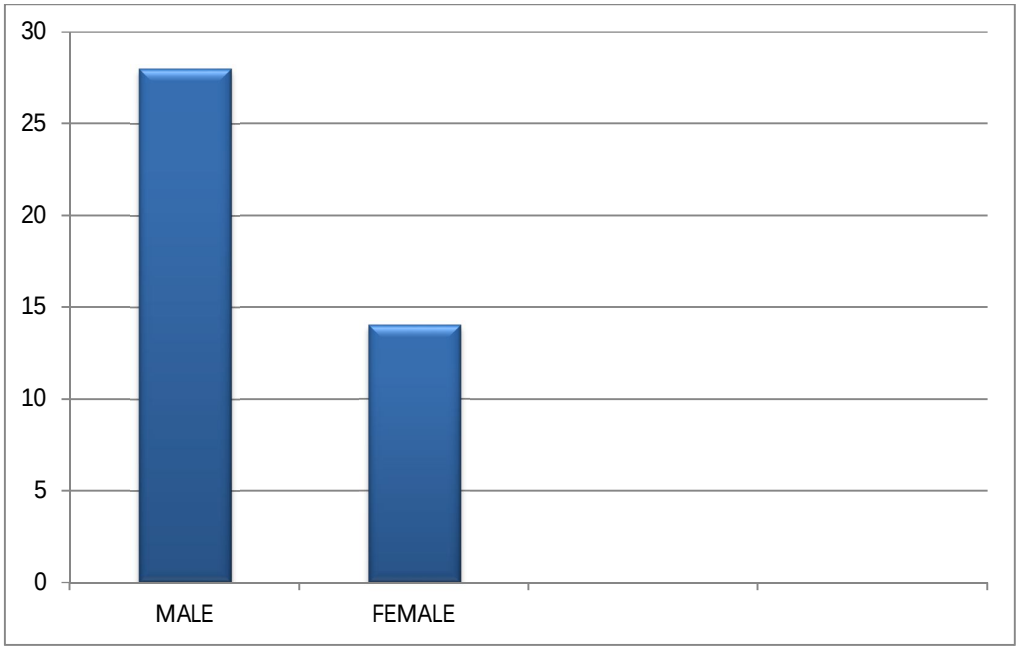
SEX DISTRIBUTION OF PATIENTS:

TABLE 2 SHOWING THE SEX DISTRIBUTION OF THE PATIENTS

SEX	FREQUENCY	PERCENTAGE %
MALE	28	67
FEMALE	14	33
TOTAL	**42**	**100**

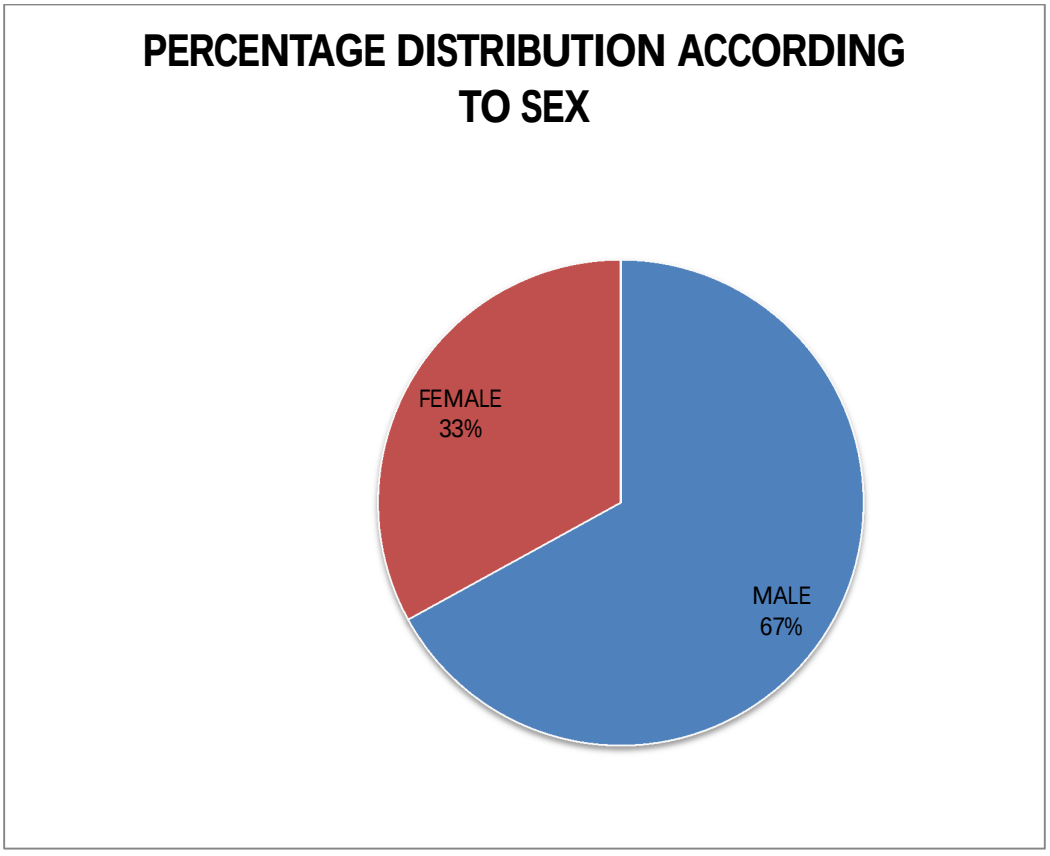
The above table shows the sex distribution of the total study population.

FIGURE 5 : FREQUENCY DISTRIBUTION OF STUDY POPULATION ACCORDING TO SEX



Bar chart shows that among the total population 28 were males and 14 were females.

FIGURE 6 : PERCENTAGE DISTRIBUTION OF STUDY POPULATION ACCORDING TO SEX



The above chart shows that among the total population ,67% were males and 33% were females.

MDCT DIAGNOSIS AMONG THE STUDY POPULATION:

TABLE 3 SHOWING THE MDCT DIAGNOSIS AMONG THE STUDY POPULATION

NO	MDCT DIAGNOSIS	FREQUENCY	PERCENTAGE %
1	MALIGNANT LESION	17	40
2	PSEUDOCYST	12	29
3	MUCINOUS CYSTDENOMA	3	7
4	SEROUS CYSTADENOMA	5	12
5	INTRADUCTAL PAPLILLARY MUCINOUS NEOPLASM	2	5
6	BENIGN INFLAMMATORY /SIMPLE CYSTIC LESION	2	5
7	FOCAL PANCREATITIS	1	2
7	TOTAL	42	100

FIGURE 7 : FREQUENCY DISTRIBUTION OF MDCT DIAGNOSIS :

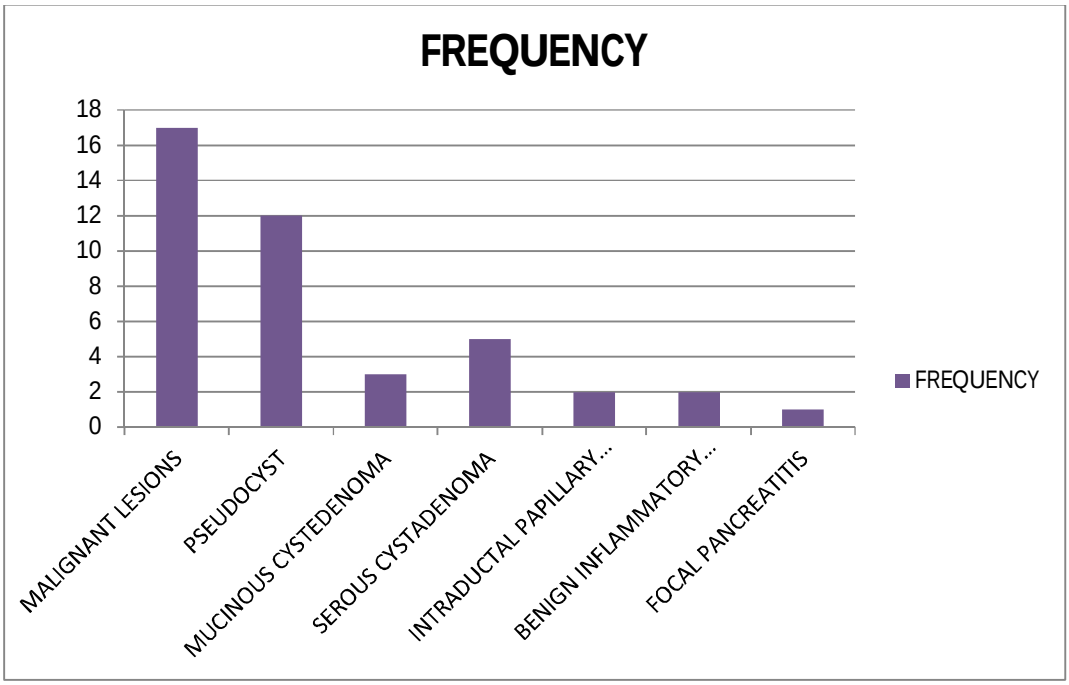
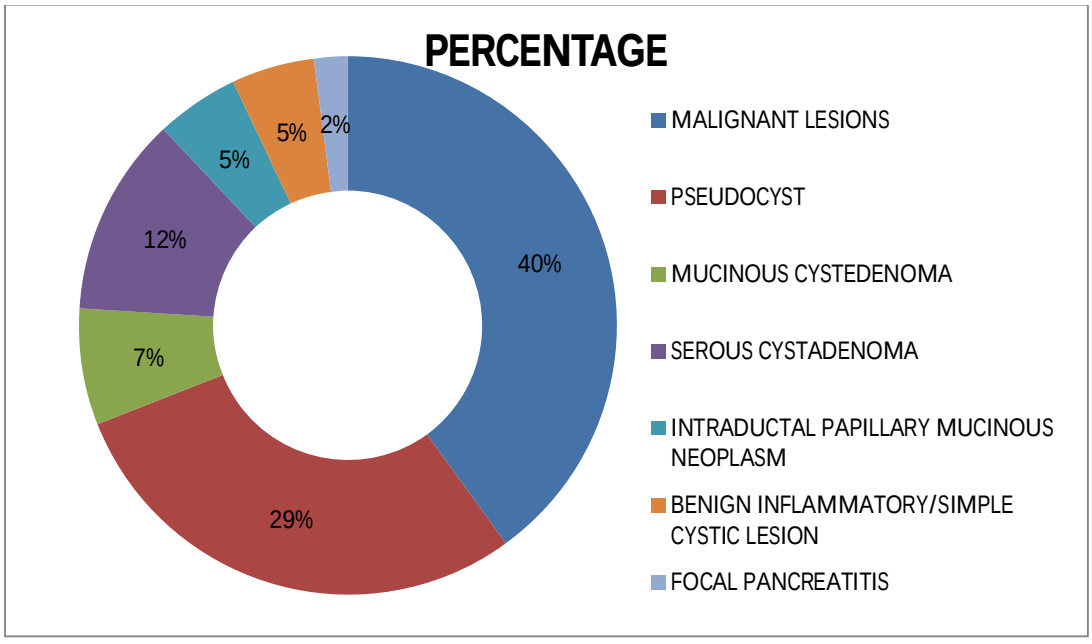


FIGURE 8: PERCENTAGE DISTRIBUTION OF MDCT DIAGNOSIS :



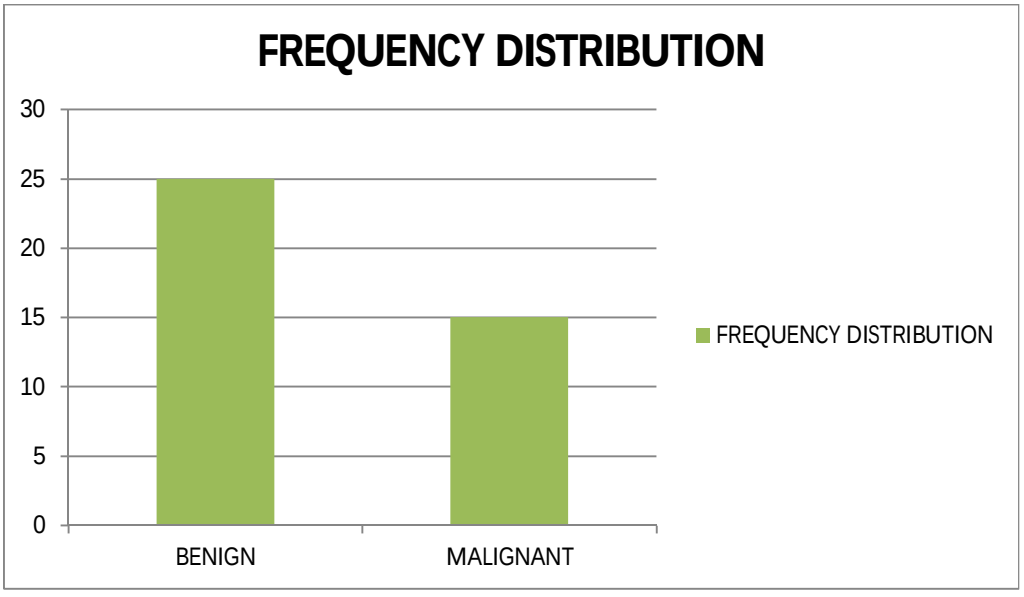
DISTRIBUTION OF TYPES OF LESIONS

TABLE 4 SHOWING THE DISTRIBUTION OF BENIGN AND MALIGNANT PANCREATIC MASS LESIONS

TYPE OF LESION	FREQUENCY	PERCENTAGE
BENIGN	25	60
MALIGNANT	17	40
TOTAL	42	100

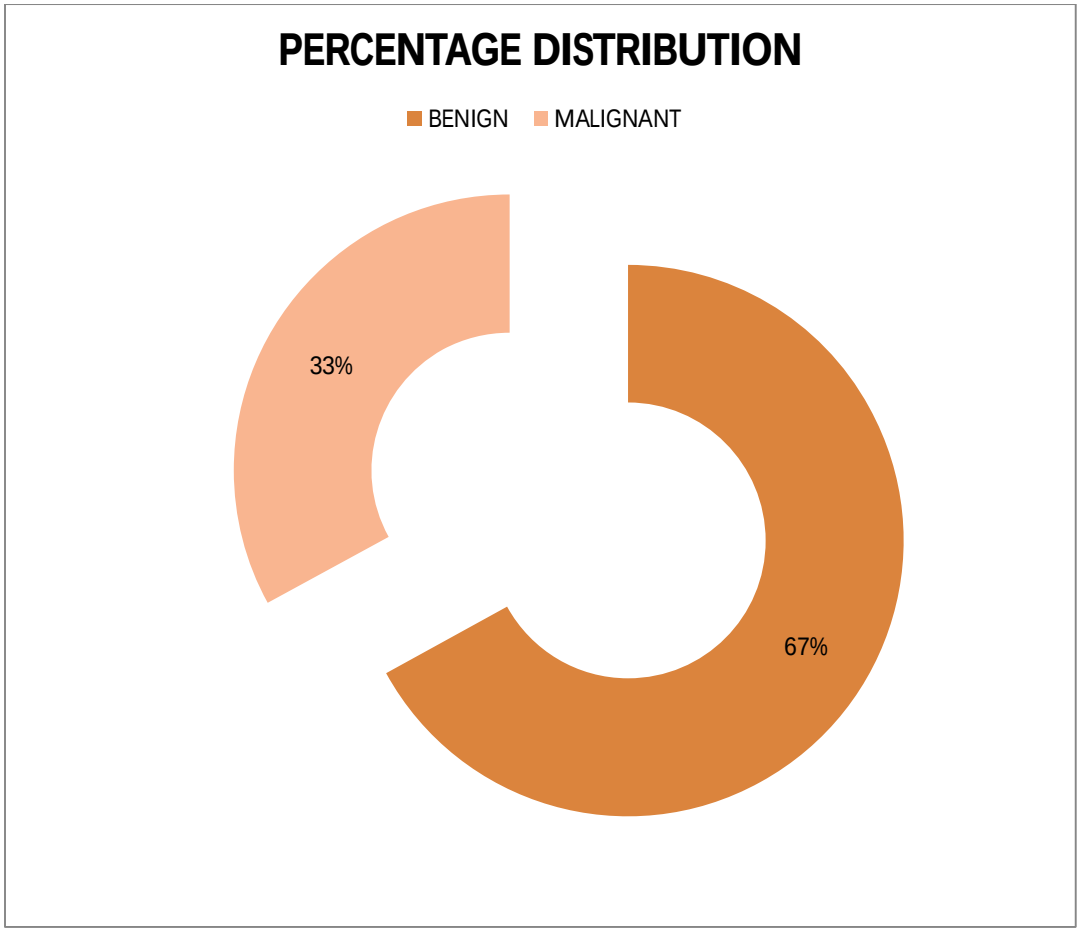
The table shows the distribution of benign and malignant focal pancreatic mass lesions.

FIGURE 9 : FREQUENCY DISTRIBUTION OF TYPE OF LESIONS :



The bar chart shows that among 42 lesions, 25 were benign and 17 were malignant.

FIGURE 10 : PERCENTAGE DISTRIBUTION OF TYPE OF LESIONS:



The chart shows that totally 60 % lesions were beingn and 40% of the lesions were malignant.

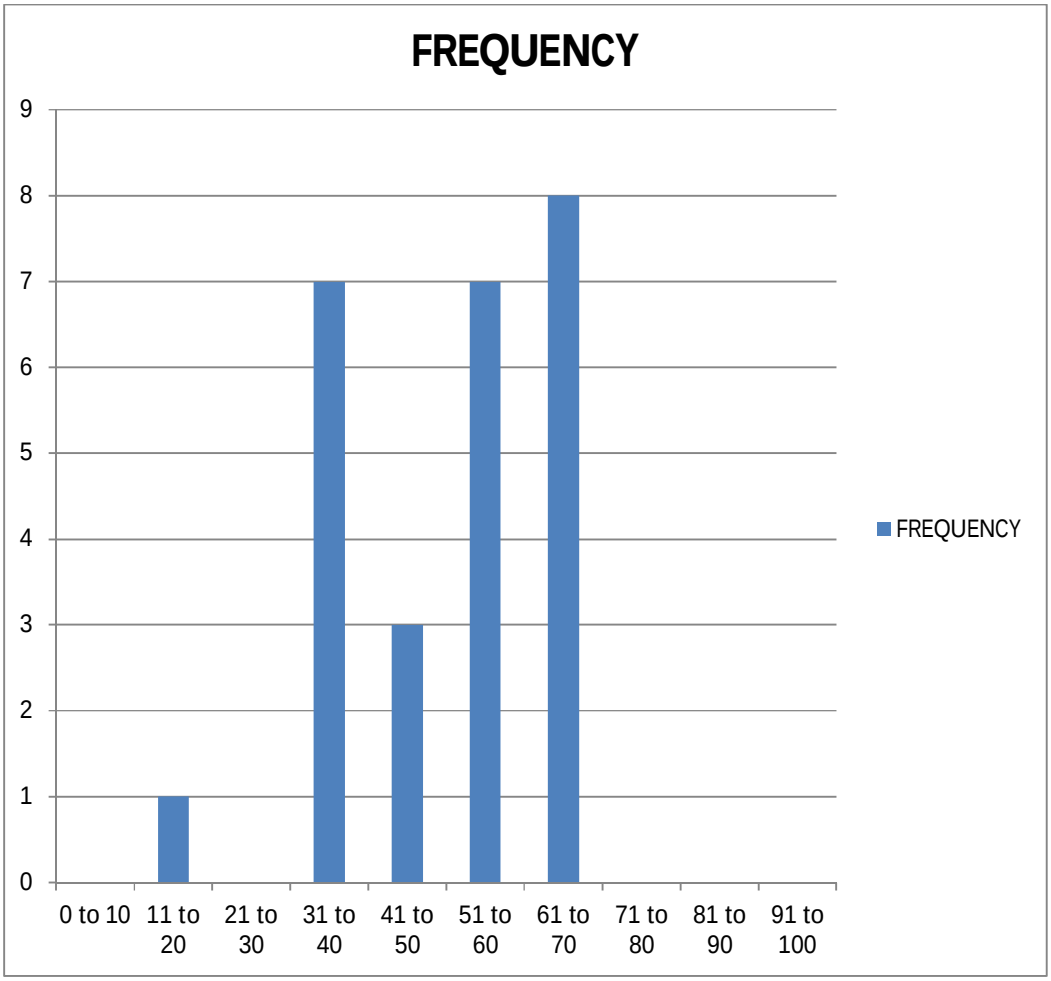
AGE DISTRIBUTION OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS :

TABLE 5: SHOWING THE AGE DISTRIBUTION OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS

AGE GROUPS (Years)	FREQUENCY	PERCENTAGE %
0 to 10	0	0
11 to 20	1	4
21 to 30	0	0
31 to 40	7	28
41 to 50	3	12
51 to 60	6	24
61 to 70	8	32
71 to 80	0	0
81 to 90	0	0
91 to 100	0	0
TOTAL	**25**	**100**

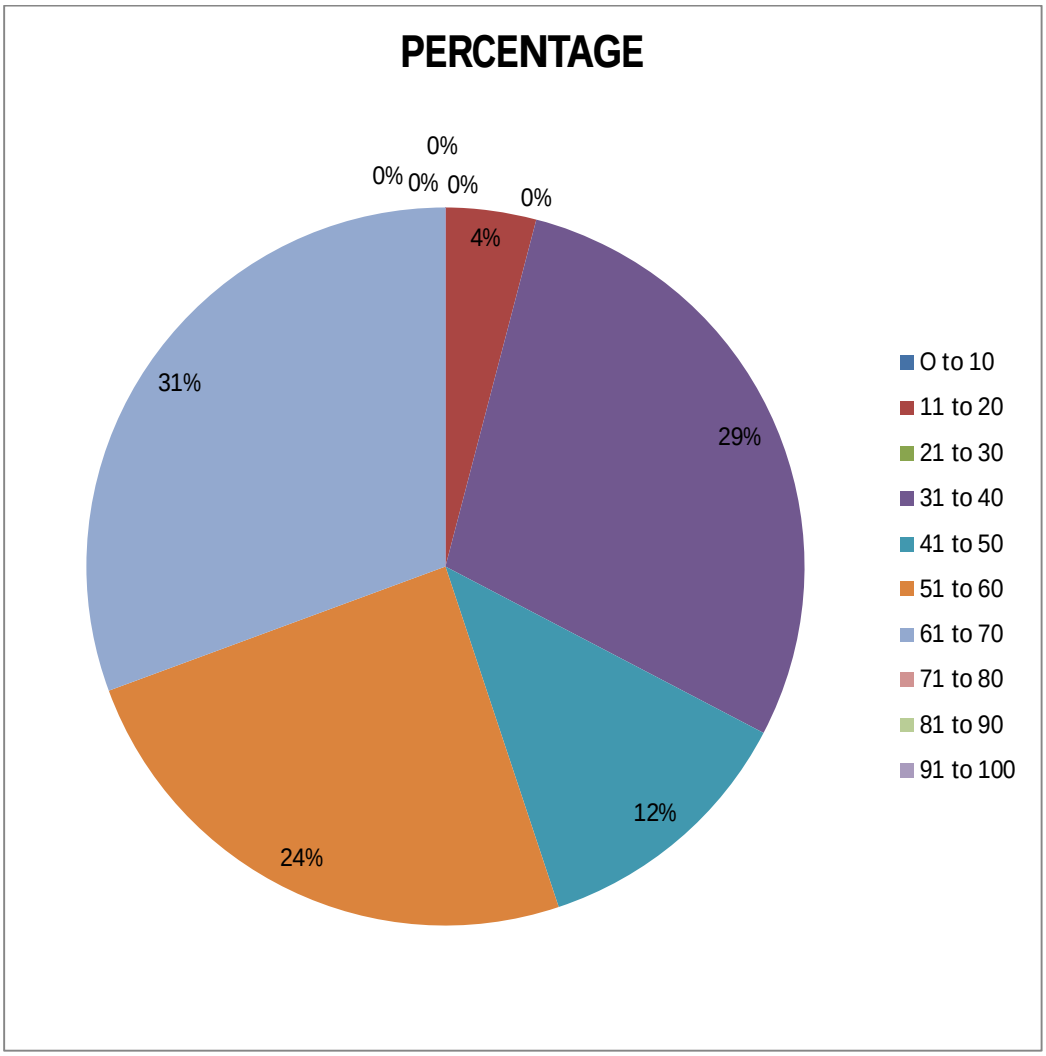
The above table shows the age distribution of the patients with benign pancreatic mass lesions.

FIGURE 11: FREQUENCY DISTRIBUTION OF AGE GROUP OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS



The chart shows the age distribution of the patients with benign pancreatic mass lesions

FIGURE 12: PERCENTAGE DISTRIBUTION OF AGE GROUP OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS



The chart shows the age distribution of the patients in percentage with benign pancreatic mass lesions.

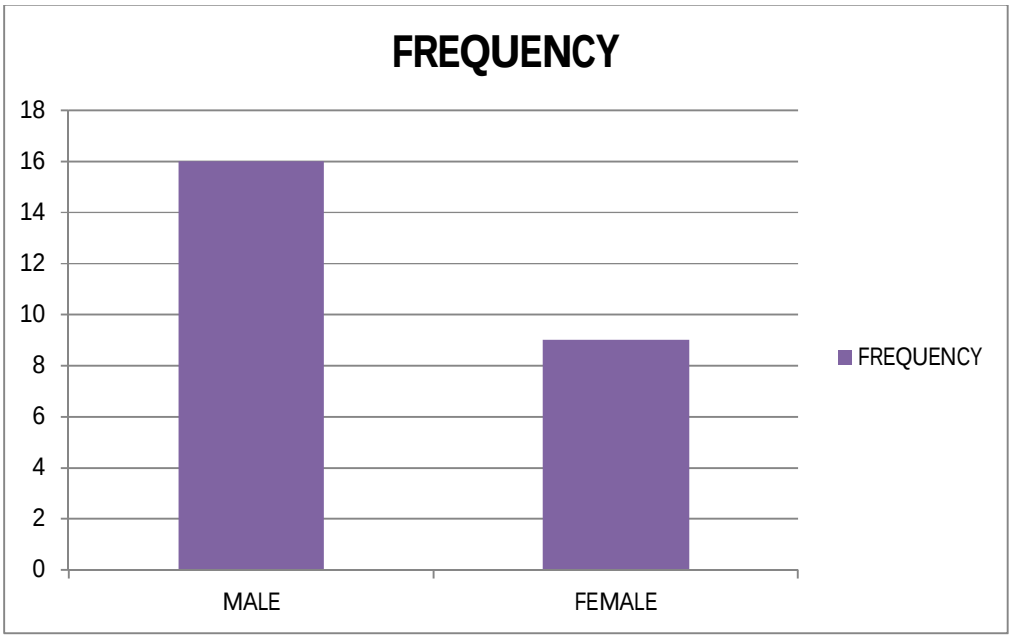
SEX DISTRIBUTION OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS

TABLE 6 : SHOWING THE SEX DISTRIBUTION OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS

SEX	FREQUENCY	PERCENTAGE %
MALE	16	64
FEMALE	9	36
TOTAL	**25**	**100**

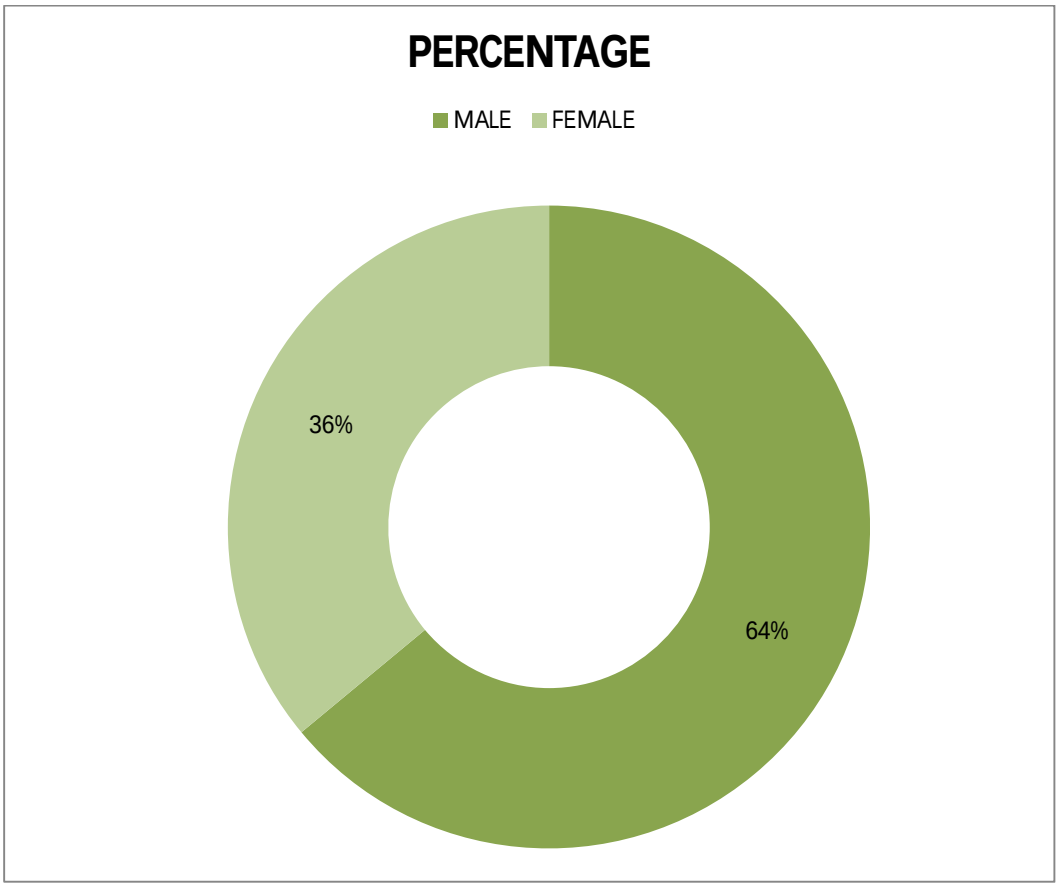
The table shows sex distribution of the patients with benign pancreatic mass lesions

FIGURE 13: FREQUENCY DISTRIBUTION OF THE PATIENTS WITH BENIGN PANCREATIC LESIONS ACCORDING TO SEX



The chart shows the among the patients with benign pancreatic lesions, 16 were seen in males and 9 were seen in females.

FIGURE 14 : PERCENTAGE DISTRIBUTION OF THE PATIENTS WITH BENIGN PANCREATIC LESIONS ACCORDING TO SEX



The pie chart shows that among the patients with benign pancreatic lesions, 64% were found in males and 36% were found in females

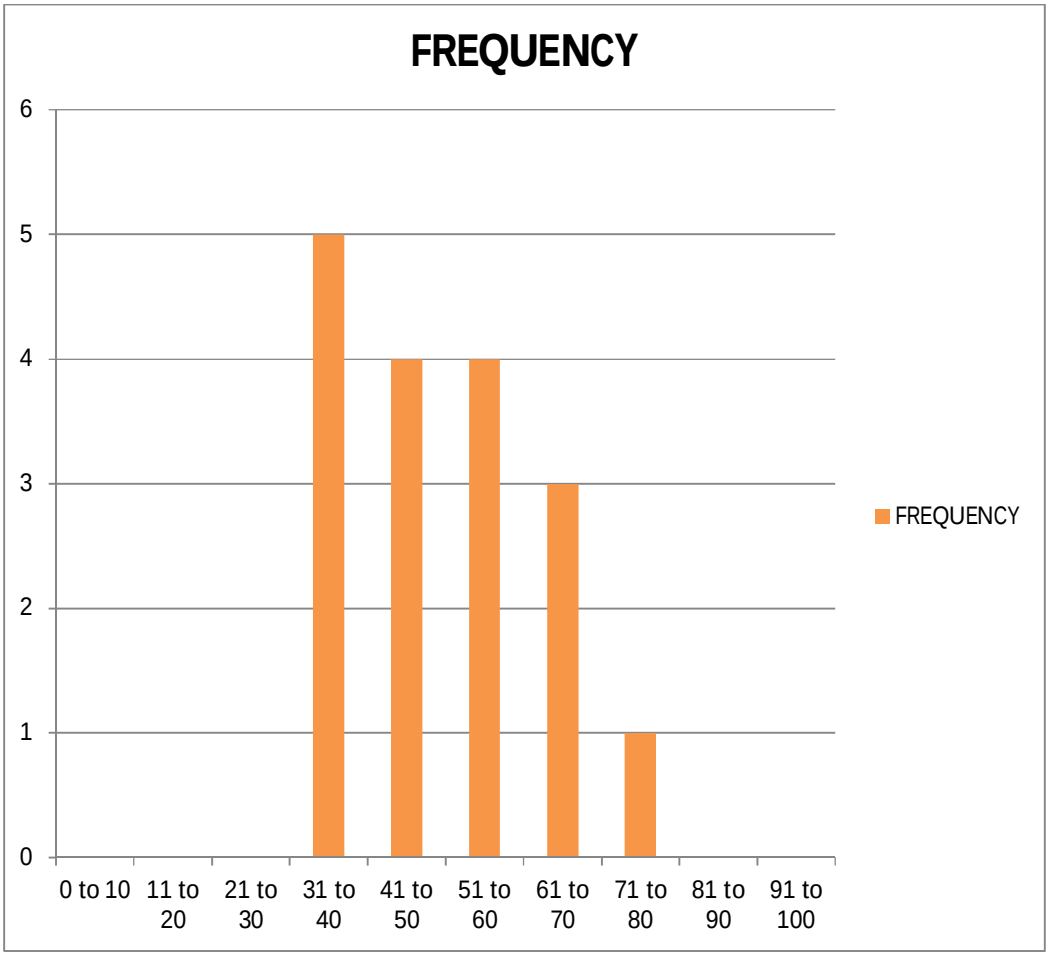
AGE DISTRIBUTION OF PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS :

TABLE 7 : SHOWING THE AGE DISTRIBUTION OF PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS :

AGE GROUPS (Years)	FREQUENCY	PERCENTAGE %
0 to 10	0	0
11 to 20	0	0
21 to 30	0	0
31 to 40	5	30
41 to 50	4	24
51 to 60	4	24
61 to 70	3	18
71 to 80	1	6
81 to 90	0	0
91 to 100	0	0
TOTAL	**17**	**100**

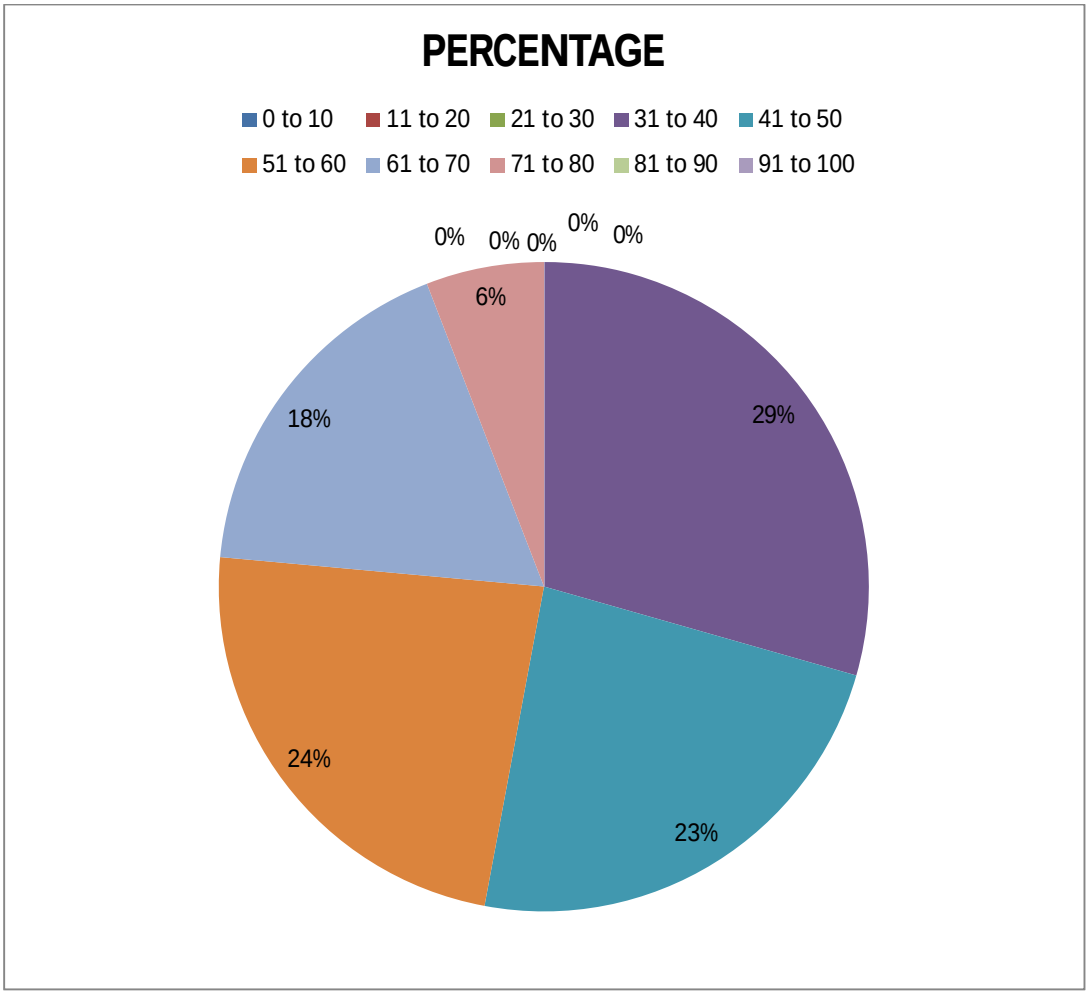
The table shows the age distribution of the patients with malignant pancreatic mass lesions.

FIGURE 15 : FREQUENCY DISTRIBUTION OF THE PATIENTS WITH MALIGNANT PANCREATIC LESIONS ACCORDING TO AGE GROUPS



The chart shows the age distribution of the patients with malignant pancreatic mass lesions

FIGURE 16: FREQUENCY DISTRIBUTION OF THE PATIENTS WITH MALIGNANT PANCREATIC LESIONS ACCORDING TO AGE GROUPS



The chart shows the age distribution of the patients in percentage with malignant pancreatic mass lesions.

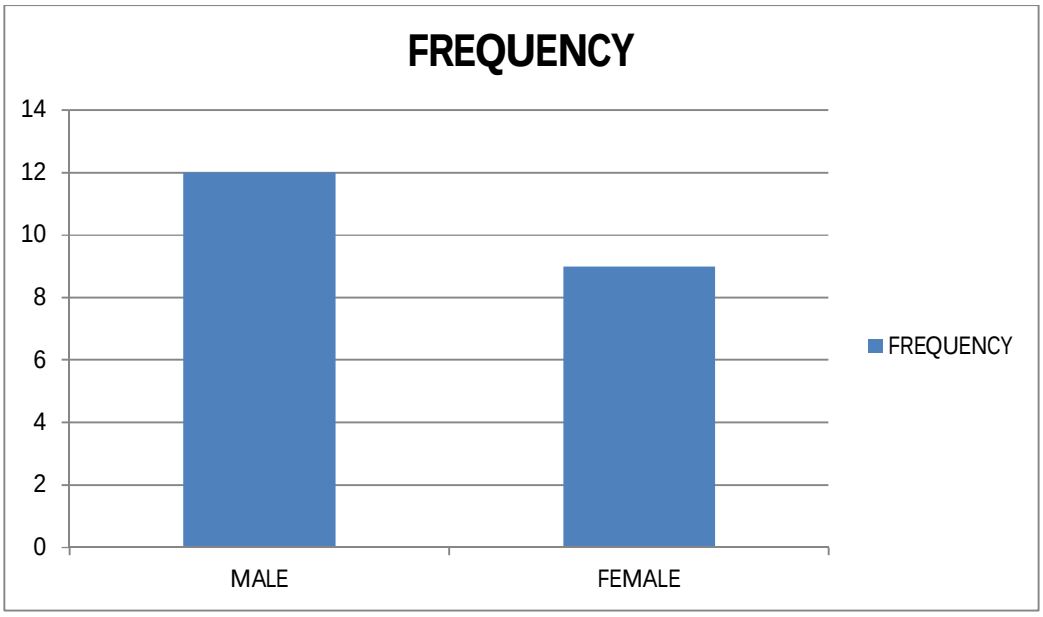
SEX DISTRIBUTION OF PATIENTS WITH MALIGNANT PANCREATIC LESIONS :

TABLE 8 :SHOWING THE SEX DISTRIBUTION OF PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS

SEX	FREQUENCY	PERCENTAGE %
MALE	12	70
FEMALE	5	30
TOTAL	**17**	**100**

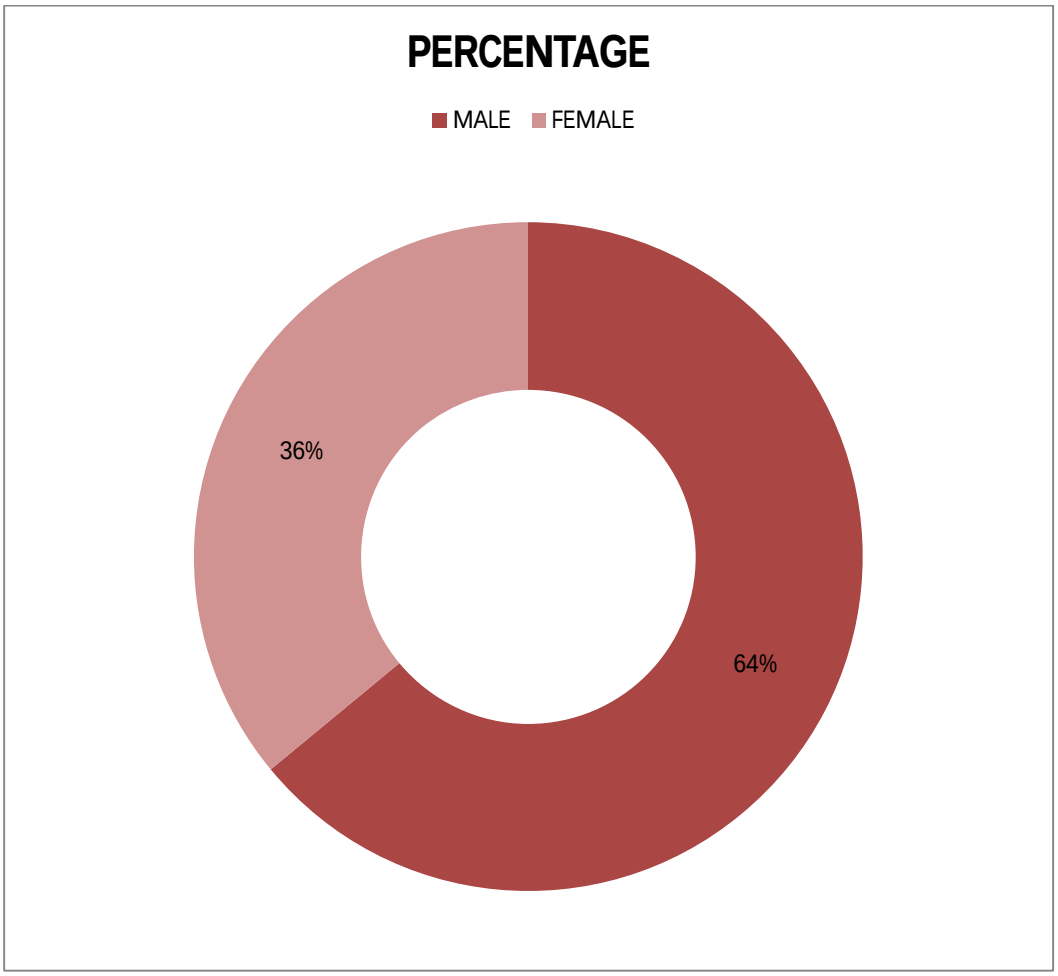
The table shows sex distribution of the patients with malignant pancreatic mass lesions.

FIGURE 17: FREQUENCY DISTRIBUTION OF THE PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS ACCORDING TO SEX :



The chart shows that among the patients with malignant pancreatic mass lesions 12 were seen in males and 5 were seen in females.

FIGURE 18: PERCENTAGE DISTRIBUTION OF THE PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS ACCORDING TO SEX :



The chart shows that among the patients with malignant pancreatic mass lesions70 % were seen in males and 30 % were seen in females.

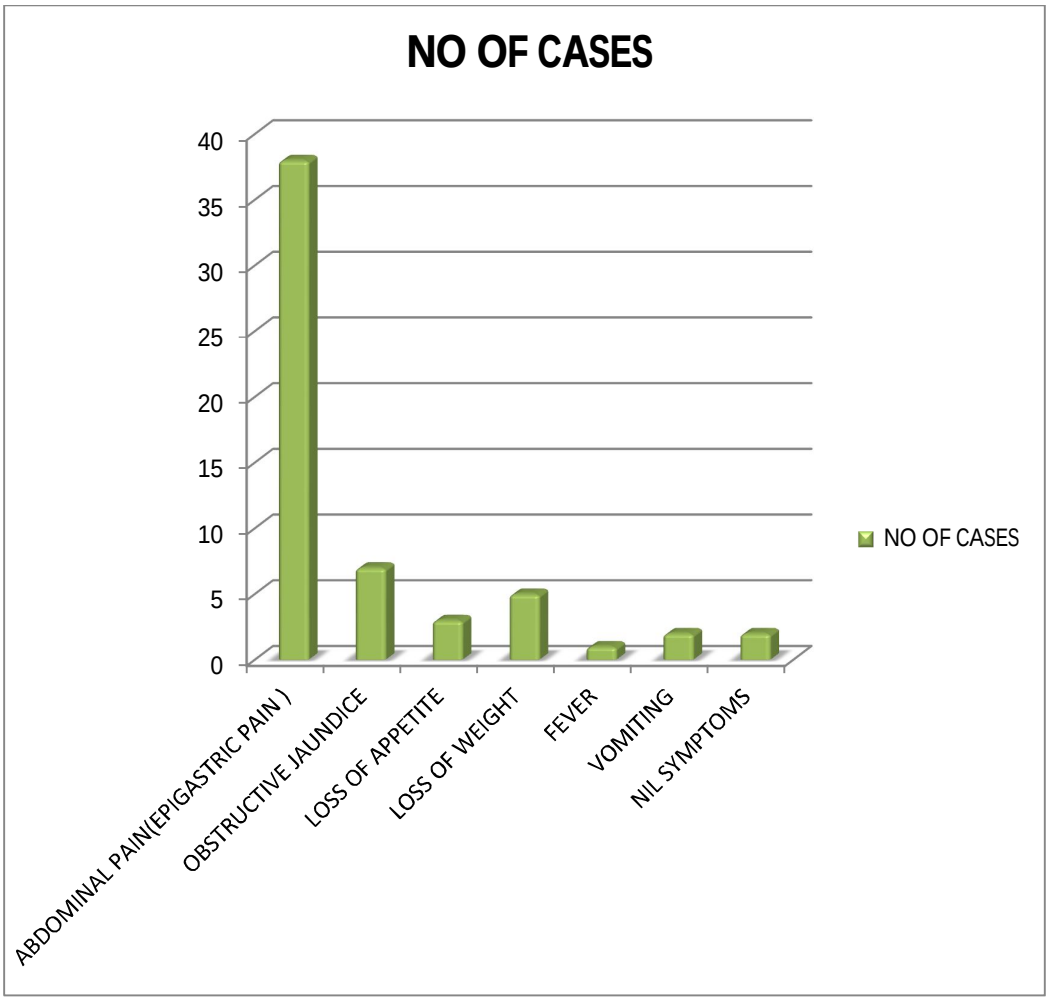
VARIOUS SYMPTOMS OF PATIENTS:

TABLE 9 SHOWING VARIOUS SYMPTOMS OF THE PATIENTS

SYMPTOMS	NO OF CASES FREQUENCY	NO OF CASES PERCENTAGE %
ABDOMINAL PAIN (EPIGASTRIC PAIN)	36	60
JAUNDICE	11	18
LOSS OF APPETITE	2	3
LOSS OF WEIGHT	6	10
FEVER	1	2
VOMITING	2	3
NIL SYMPTOMS	2	3

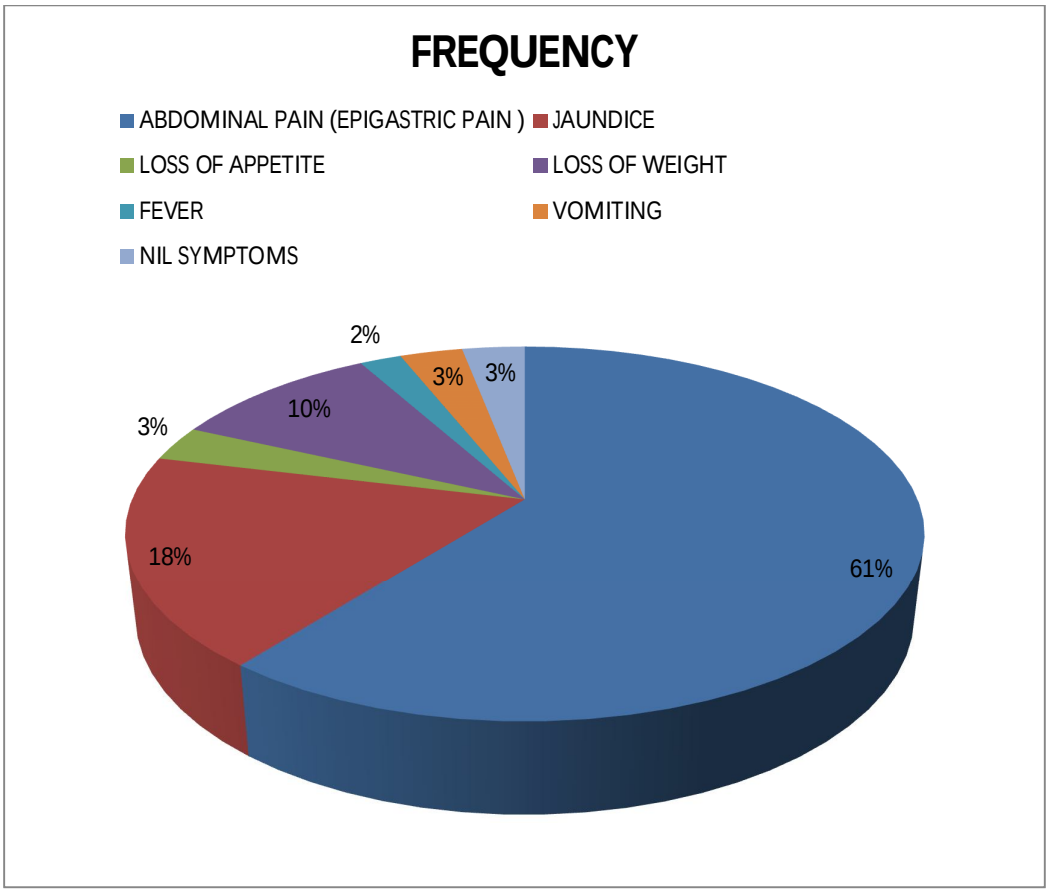
The table shows the distribution of various symptoms among the total population.

FIGURE 19: FREQUENCY DISTRIBUTION OF VARIOUS SYMPTOMS OF THE PATIENTS :



The chart shows the frequency distribution of the various symptoms among the total population.

FIGURE 20: PERCENTAGE DISTRIBUTION OF VARIOUS SYMPTOMS OF THE PATIENTS



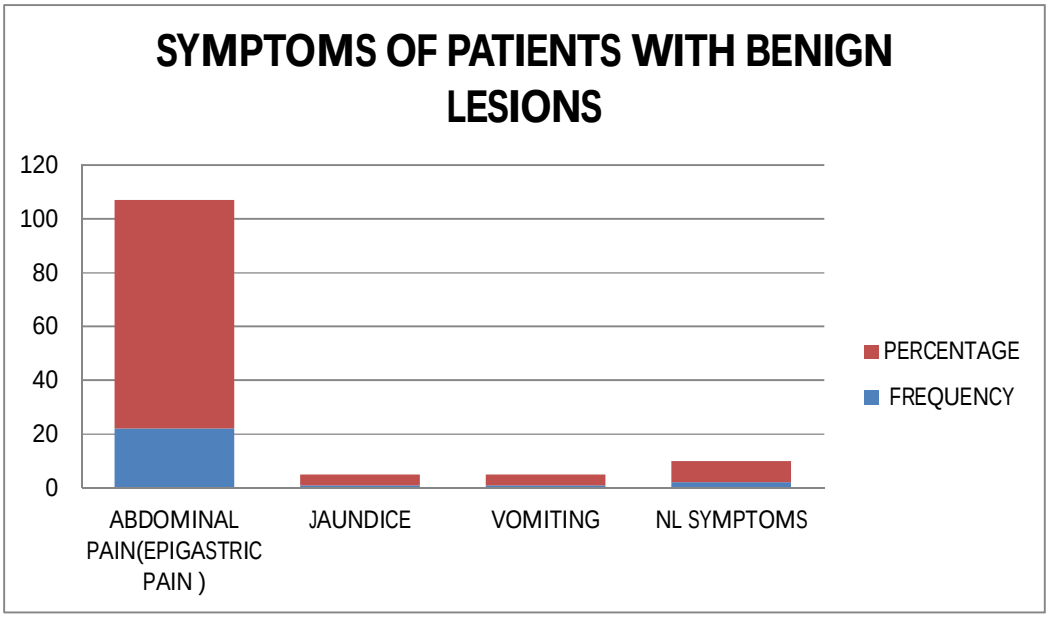
The chart shows the percentage distribution of the various symptoms among the total population.

VARIOUS SYMPTOMS OF PATIENTS WITH BENIGN PANCREATIC MASS LESIONS :

TABLE 10 SHOWING THE VARIOUS SYMPTOMS OF THE PATIENTS WITH BENIGN PANCREATIC MASS LESIONS :

SYMPTOMS	NO OF CASES FREQUENCY	NO OF CASES PERCENTAGE %
ABDOMINAL PAIN (EPIGASTRIC PAIN)	22	85
JAUNDICE	1	4
VOMITING	1	4
NIL SYMPTOMS	2	8

FIGURE 21 SHOWING THE FREQUENCY AND PERCENTAGE DISTRIBUTION OF VARIOUS SYMPTOMS OF THE PATIENTS WITH BENIGN PANCREATIC MASS LESIONS

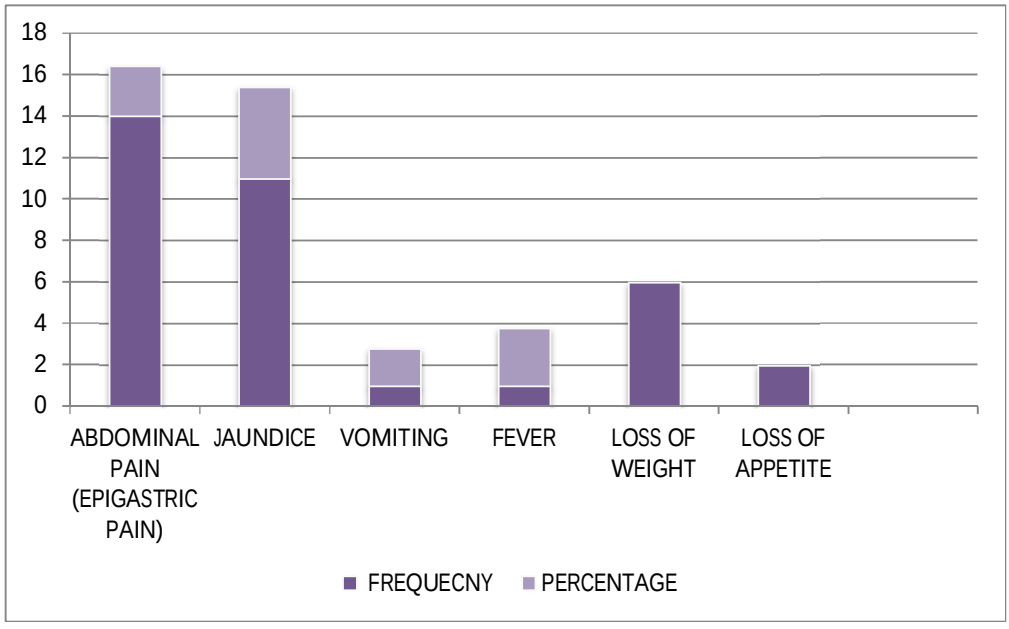


VARIOUS SYMPTOMS OF PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS :

TABLE 11 SHOWING THE VARIOUS SYMPTOMS OF THE PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS :

SYMPTOMS	NO OF CASES FREQUENCY	NO OF CASES PERCENTAGE %
ABDOMINAL PAIN (EPIGASTRIC PAIN)	14	40
JAUNDICE	11	31
VOMITING	1	3
FEVER	1	3
LOSS OF WEIGHT	6	17
LOSS OF APPETITE	2	6

FIGURE 22 SHOWING THE PERCENTAGE AND FREQUENCY DISTRIBUTION OF VARIOUS SYMPTOMS OF THE PATIENTS WITH MALIGNANT PANCREATIC MASS LESIONS



LOCATION DISTRIBUTION OF VARIOUS BENIGN AND MALIGNANT PANCREATIC MASS LESIONS :

TABLE 12 SHOWING THE LOCATION DISTRIBUTION OF VARIOUS BENIGN AND MALIGNANT PANCREATIC MASS LESIONS:

LOCATION	FREQUENCY	PERCENTAGE
HEAD	17	40
UNCINATE PROCESS	4	9
BODY	8	19
TAIL	2	5
HEAD AND UNCINATE PROCESS	3	7
HEAD AND NECK	1	2
HEAD AND BODY	4	9
NECK AND BODY	1	2
BODY AND TAIL	2	5
TOTAL	42	100

The table shows the location distribution of various benign and malignant pancreatic mass lesions among the study population.

FIGURE 23 SHOWING THE FREQUENCY OF LOCATION DISTRIBUTION OF VARIOUS BENIGN AND MALIGNANT PANCREATIC MASS LESIONS

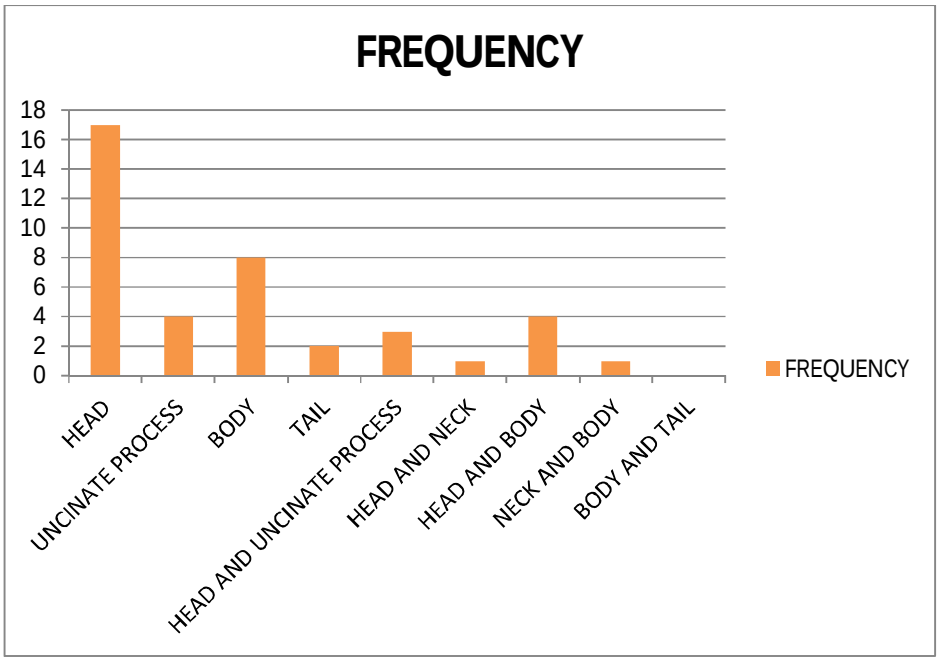
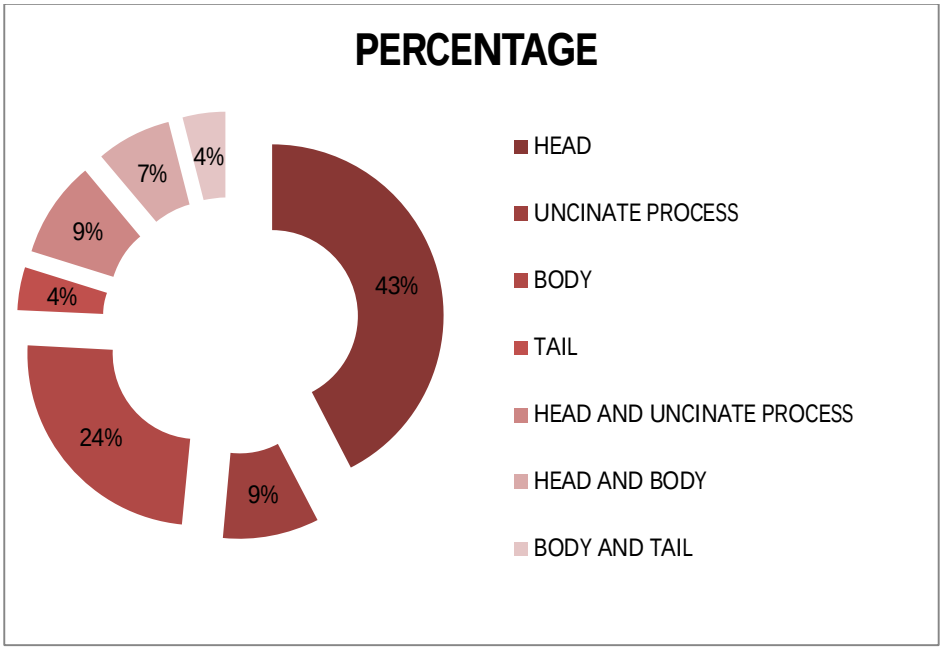


FIGURE 24 SHOWING THE PERCENTAGE OF LOCATION DISTRIBUTION OF VARIOUS BENIGN AND MALIGNANT PANCREATIC MASS LESIONS



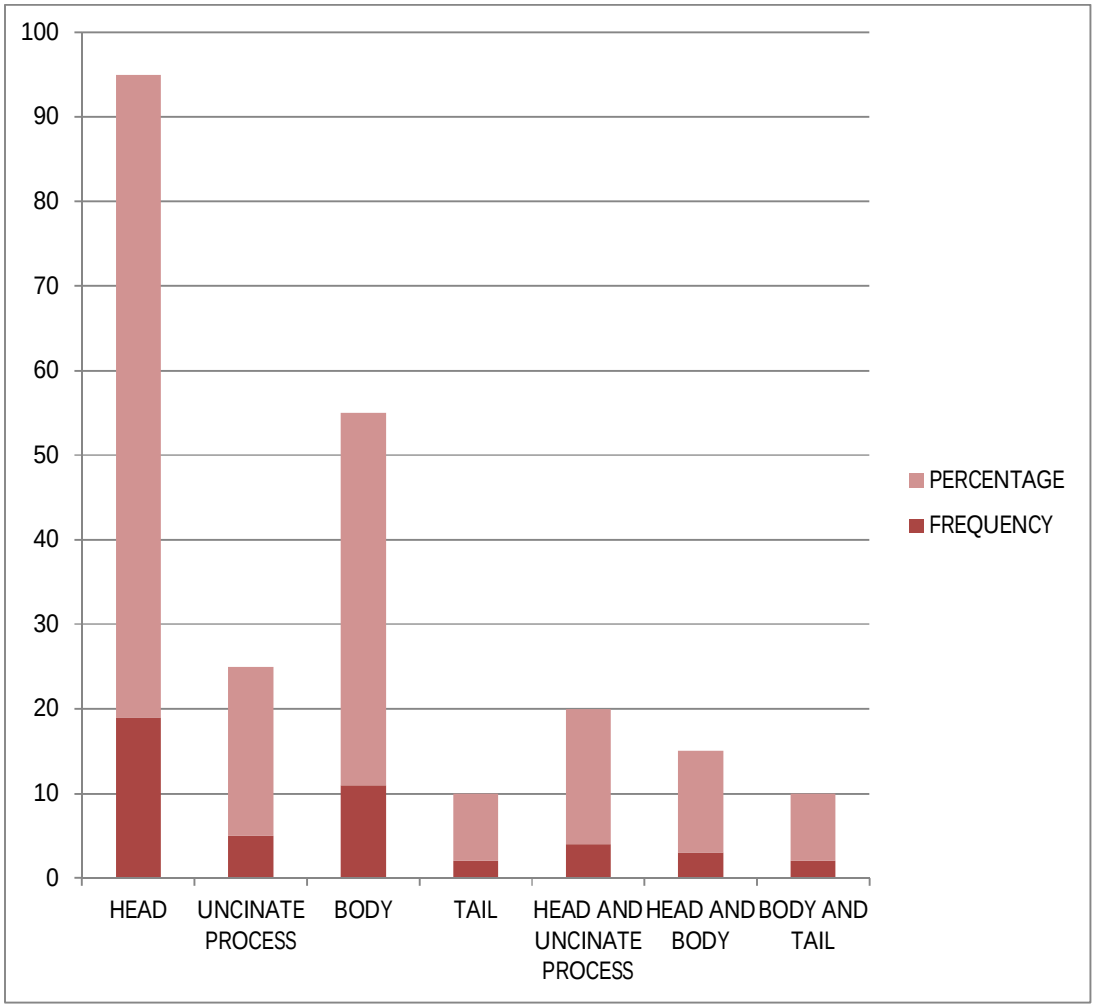
LOCATION DISTRIBUTION OF VARIOUS BENIGN PANCREATIC MASS LESIONS :

TABLE 13 SHOWING THE LOCATION DISTRIBUTION OF VARIOUS BENIGN PANCREATIC MASS LESIONS:

LOCATION	FREQUENCY	PERCENTAGE
HEAD	8	32
UNCINATE PROCESS	2	8
BODY	5	20
TAIL	2	8
HEAD AND UNCINATE PROCESS	2	8
HEAD AND BODY	4	16
BODY AND TAIL	2	8
TOTAL	25	100

The table shows the location distribution of various benign pancreatic mass lesions among the study population .

FIGURE 25 SHOWING THE FREQUENCY AND PERCENTAGE OF LOCATION DISTRIBUTION OF VARIOUS BENIGN PANCREATIC MASS LESIONS



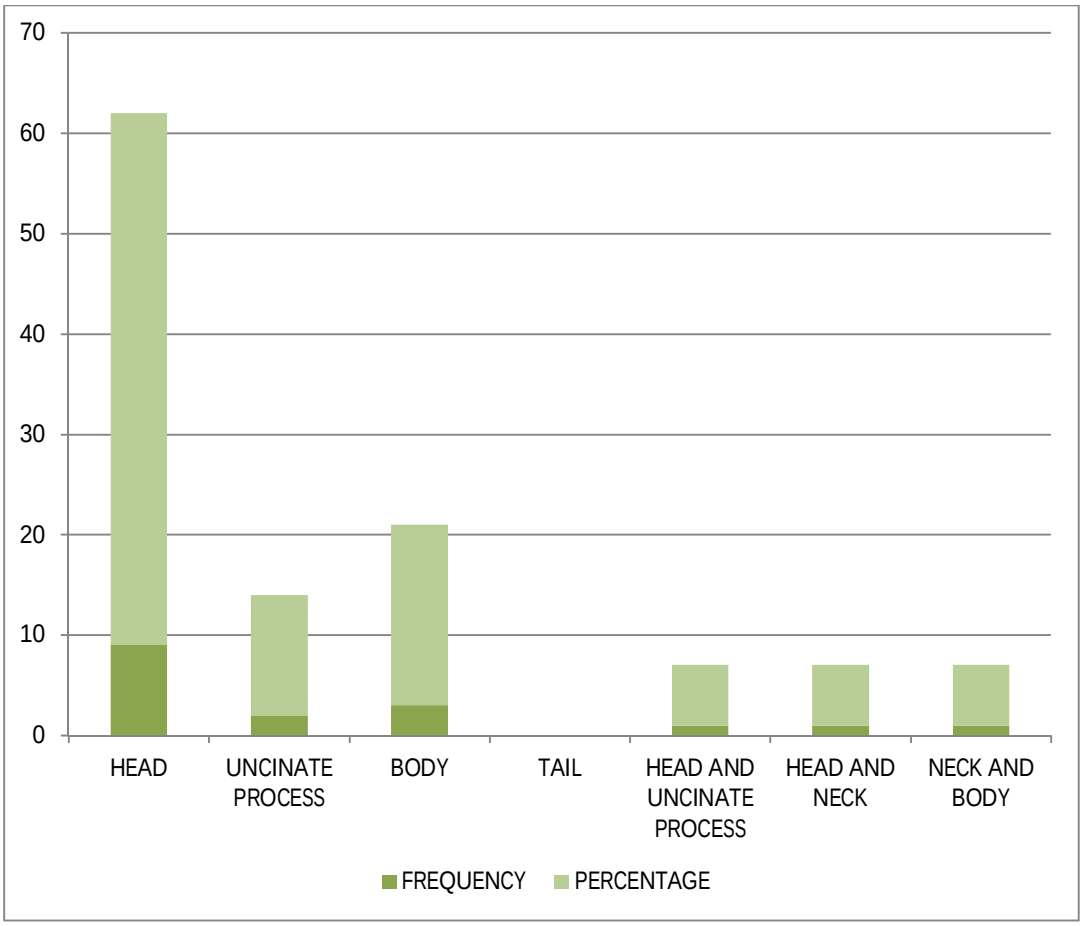
LOCATION DISTRIBUTION OF VARIOUS MALIGNANT PANCREATIC MASS LESIONS

TABLE 14 SHOWING THE LOCATION DISTRIBUTION OF VARIOUS MALIGNANT PANCREATIC MASS LESIONS:

LOCATION	FREQUENCY	PERCENTAGE
HEAD	9	53
UNCINATE PROCESS	2	12
BODY	3	18
TAIL	0	0
HEAD AND UNCINATE PROCESS	1	6
HEAD AND NECK	1	6
NECK AND BODY	1	6
TOTAL	17	100

The table shows the location distribution of various malignant pancreatic mass lesions among the study population.

FIGURE 26 SHOWING THE FREQUENCY AND PERCENTAGE OF LOCATION DISTRIBUTION OF VARIOUS MALIGNANT PANCREATIC MASS LESIONS



FINAL CYTOLOGICAL DIAGNOSIS:

TABLE 15 SHOWING VARIOUS FINAL CYTOLOGICAL DIAGNOSIS

NO	PATHOLOGY	FREQUENCY	PERCENTAGE %
1	MALIGNANT LESIONS - ADENOCARCINOMA	16	38
2	MALIGNANT LESIONS – NEUROENDOCRINE NEOPLASM	1	2
3	MUCINOUS CYSTDENOCARCINOMA	1	2
3	NO MALIGNANCY	1	2
4	PSEUDOCYST	10	24
5	BENIGN SEROUS CYSTIC LESION	5	12
6	BENIGN MUCINOUS CYSTIC LESION	5	12
7	SIMPLE CYSTIC/ BENIGN INFLAMMATORY LESION	2	5
7	FOCAL PANCREATITIS	1	2
8	TOTAL	42	100

The above table shows the distribution of various final cytological diagnosis

FIGURE 27 : FREQUENCY DISTRIBUTION OF SHOWING VARIOUS FINAL CYTOLOGICAL DIAGNOSIS:

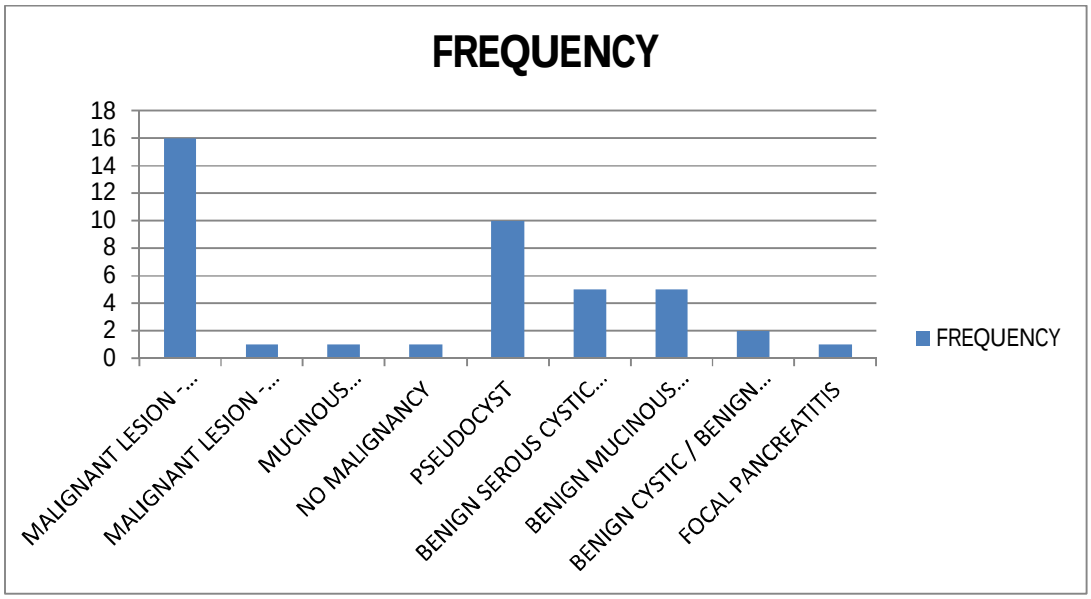


FIGURE 28: PERCENTAGE DISTRIBUTION OF SHOWING VARIOUS FINAL CYTOLOGICAL DIAGNOSIS:

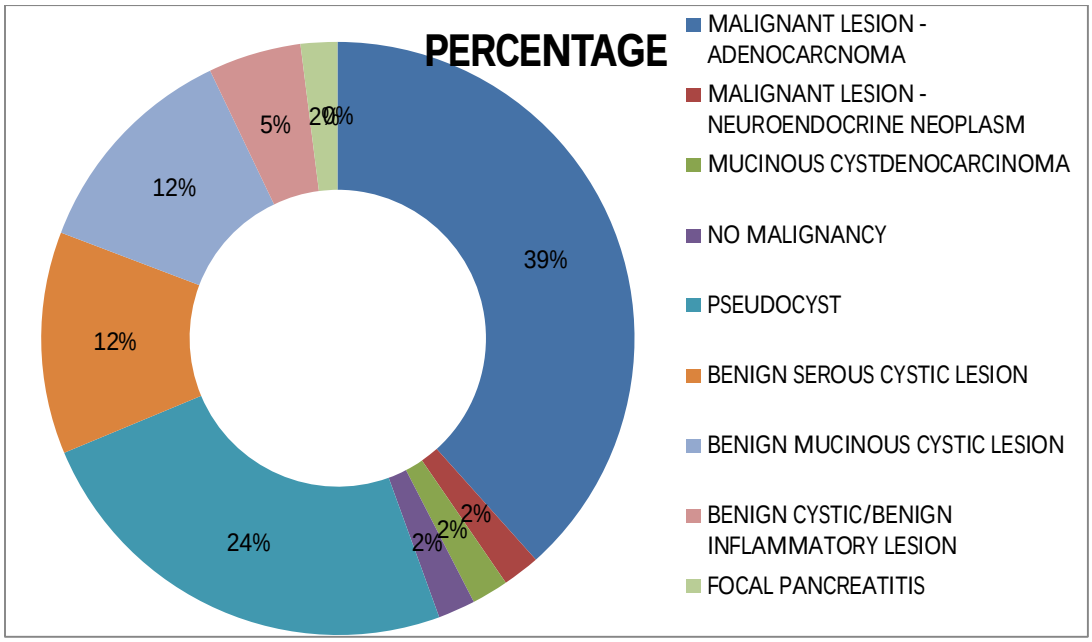


TABLE 16 CT FINDING VS CYTOLOGICAL FINDINGS

TYPE OF LESIONS	TOTAL NO OF CASES	CONCORDANT CASES	DISCORDANT CASES
BENIGN	25	23	2
MALIGNANT	17	16	1

TABLE 17 a : STATISTICAL ANALYSIS

The Sensitivity / Specificity statistical results are computed below.

STATISTICS	MDCT IN BENIGN PANCREATIC MASS LESIONS
Sensitivity	95%
Specificity	88.8%
Positive Predicitive Value	92%
Negative Predicitive Value	94%

TABLE 17 b : STATISTICAL ANALYSIS

The Sensitivity / Specificity statistical results are computed below.

STATISTICS	MDCT IN MALIGNANT PANCREATIC MASS LESIONS
Sensitivity	88.8%
Specificity	95%
Positive Predicitive Value	94%
Negative Predicitive Value	92%

DISCUSSION

In our study which included 42 patients, all of them were evaluated with MDCT for focal pancreatic lesions and the results were compared with endoscopic ultrasound and endoscopic ultrasound guided fine needle aspiration cytology results. The various MDCT diagnosis which were given are malignant lesions in 17 patients , pseudocysts in 12 patients, serous cystadenoma in 5 patients, mucinous cystdenoma in 3 patients, intraductal papillary mucinous neoplasm in 2 patients , benign inflammtory /simple cystic lesion in 2 patients and focal pancreatitis in 1 patient.

Among the 42 patients with 42 lesions, 25 lesions were benign and 17 were malignant. The mean age group of the study population is 50.95 which ranged from 18 years to 75 years . The mean age of the patients (no = 25) with benign lesions is 49.4 years ranging from 18 to 70 years and mean age of the patients (n=17) with malignant lesions is 53.1 years which ranged from 36 to 75 years. This finding was comparable with the study done by **Jemal et al**[(2)]

Out of the total 42 patients, 28 were male and 14 were females which corresponded to 33% males and 67 % females. Out of the 28 male patients, 16 patients had benign lesions and 12 patients had malignant lesions. Out of the total 14 female patients, 9 patients had benign lesions and 5 patients had malignant lesions. This finding was comparable with study by **Hossain MS, Saha PP et al**[(1)]

The various symptoms with which the patients presented were abdominal pain mainly in the epigastric region, jaundice which was obstructive with elevated bilirubin levels, loss of appetite, loss of weight, fever, vomiting and few presented with nil symptoms. Pain was the most common complaint seen in 60 % of the population. This was in concordance with study by **Mahmoud Abdelaziz Dawoud et al** [6].Total of 36 patients had abdominal pain (epigastric region), out of which 22 patients had benign lesions and 14 patients had malignant lesions. Total of 11 patients presented with jaundice, out of which 1 patient had benign diagnosis and rest of the 10 patients had malignant lesions. Total of 2 patients presented with loss of appetite and 6 patients had loss of weight and all these patients had only malignant lesions. Fever was seen in one patient who was diagnosed to have malignant lesion.2 patients presented with vomiting, 1 patient had benign lesion and 1 had malignant lesion. Totally 2 patient had no symptoms at all.

Location distribution of different lesions were in the region of head, uncinate process, body, tail , head and uncinate process, head and neck, head and body, neck and body , body and tail. A total of 17 lesions were present in the head region, out of which 8 lesions were benign lesions and the remaining 9 lesions were malignant . 4 lesions were seen in the uncinate process, out of which 2 were benign lesions and 2 were malignant lesions. 8 lesions were present in the body region, out of which 5 lesions were benign and 3 lesions were malignant. 2 lesions were seen in the tail region and both of those were

benign lesions.None of the malignant lesions were seen in the tail region. A total of 3 lesions were seen in the head and uncinate process, out of which 2 lesions were benign and the remaining one was malignant. 1 lesion was in the head and neck region which turned out to be a malignant lesion. 4 lesions were seen in the head and body region of which all the lesions were malignant.In the region of neck and body , only 1 lesion was seen and that too was a malignant lesion . A total of 2 lesion was seen in the body and tail region .Finaly most of the malignant lesions were located in the head region and most of the benign lesions were also seen in the head region. This was in comparison with the study by **Becher and Stommer et al**[(3)]

Among 17 malignant lesions, the final pathological diagnosis was adenocarcinoma in 14 patients, 1 patient had neuroendocrine neoplasm and 1 patient had mucinous cystdenocarcinoma. Adenocarcinoma was found to be the commonest pathological diagnosis which was in concordance with the study done by **scaglion at al** [(3)].Among the 17 patients with malignant lesions ,MDCT detected the presence of vascular invasion in 13 patients all of them were managed by palliative means ,whereas 3 patients had no vascular invasion who eventually underwent whipple's surgery. Regional lymphnodes were seen in 6 patients and distant metastases was present in 2 patients.

Final statistical analysis revealed sensitivity, specificity, positive and negative predictive values of MDCT in evaluation of benign pancreatic mass lesions were 95%, 88.8%, 92%,94% and malignant pancreatic mass lesions

were 88.8%,95%,94%,92% respectively.Among the 25 patients with benign lesions, 23 lesions were concordant and 2 lesions were discordant with the final cytological diagnosis. Among the 17 patients with malignant lesions, 16 lesions were concordant with the final cytological diagnosis which were proved as malignant lesions whereas there was no evidence of malignancy in 1 lesion. These results were comparable with study by **Hossain MS, Saha PP et al[1] and M Arabul, et al[16]**

The statistical analysis for endoscopic ultrasound revealed sensitivity, specificity, positive and negative predictive values of MDCT in evaluation of benign and malignant focal pancreatic mass lesions as 92%,83%, 88%,88% and 83%,92%,88%,88% respectively. These results were comparable with studies by **Jenssen et al [19] and Legmann paul et al [20]**

Endoscopic ultrasound is very sensitive in detecting lesions less than 3cm in diameter. CT provides very good depiction of enhancement of the pancreatic parenchyma and also describing small vessels. For assessment of encasement of right hepatic artery endoscopic ultrasound was considered superior whereas for detecting encasement of the superior mesenteric artery, CT was considered superior. CT was more superior for detecting mesenteric lymphnode involvement. several draw backs in endoscopic ultrasound are operator dependant, underestimation of involvement of major blood vessels, underestimation of distant metastases.

CT is comparatively less invasive and does not require sedation or monitoring of heart rate and oxygen saturation. Endoscopic ultrasound enables aspiration or biopsy from the pancreatic masses. Multidetector computed tomography provides with three dimensional multiplanar reconstruction thereby enabling exact and accurate description of the involvement by the tumour into the common bile duct , main pancreatic duct and vasculature in peripancreatic region.

In endoscopic ultrasound, the features that suggest vascular invasion are irregular vessel wall, vessel lumen narrowing, presence of echogenic content within the vessel, presence of collaterals, when there is loss of echogenic plane between the vessel and tumour then it indicates poor prediction for detection of vascular involvement. Portal vein, splenic vein and proximal superior esenteric vein are quite easy to visualize of endoscopic ultrasound than the other major vessels in peripancreatic region and also the distal superior mesenteric vein and superior mesenteric artery.

CONCLUSION

1) Contrast-enhanced multiphase pancreatic imaging by multislice computerized tomography along with its postprocessing techniques is considered as the imaging modality of choice for diagnosis of pancreatic mass lesions and characterizing them into cystic,solid and in case ofmalignancy further playing a role in resectabilty.

2) Contrast enhanced MDCT plays an important role in detecting as well as staging pancreatic cancer.

3) Better optimization of the imaging protocols with thinner sections aids in better resolution, thereby enabling for accurate determination of benign and malignant pancreatic lesions and also in tumour staging.

4) Endoscopic ultrasound adds a complementary role in evaluating focal pancreatic mass lesions and becomes the modality of choice in those patients with high index of clinical suspicion.

5) In our study we prospectively studied the role of MDCT in evaluation of focal pancreatic mass lesions wherein we compared the MDCT findings with available endoscopic ultrasound findings / surgical/ cytological/ histopathological findings and finally sensitivity, specificity, positive and negative predictive values of MDCT in evaluation of benign pancreatic mass lesions are 95%,88.8%,92%,94% respectively and in evaluation of malignant pancreatic mass lesions are 88.8%,95%,94% and 92% respectively

LIMITATIONS

- Sample size is one of the limitations.
- Cost of the study (for MDCT and endoscopic ultrasound)
- Radiation exposure restricts the study in pregnant patients.
- Operator dependency in case of endoscopic ultrasound study.

RECOMMENDATIONS

- We would recommend that all patients with clinical findings /biochemical markers /ultrasound findings suggestive of pancreatic lesions should undergo MDCT for characterizing the lesions as benign and malignant thereby helping them by providing effective way for further management and treatment.

REPRESENTATIVE CASES

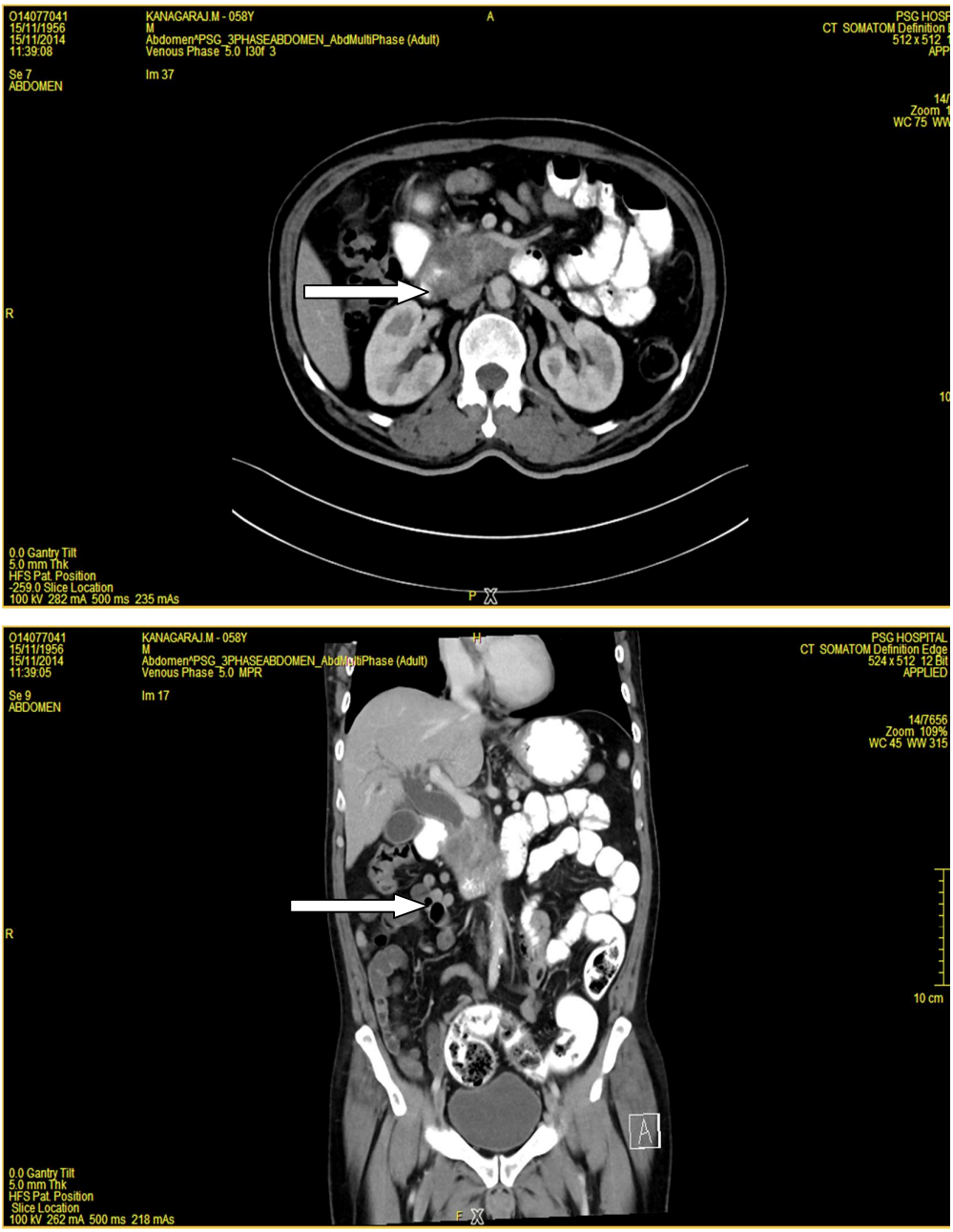


FIG 29: CASE 1 : PANCREATIC ADENOCARCINOMA : Axial and coronal MDCT images shows malignant mass lesion involving the head of pancreas obstructing the common bile duct and main pancreatic duct. Portal and superior mesenteric vessels are free.Intrahepatic biliary radicles and right and left hepatic ducts are diltated.

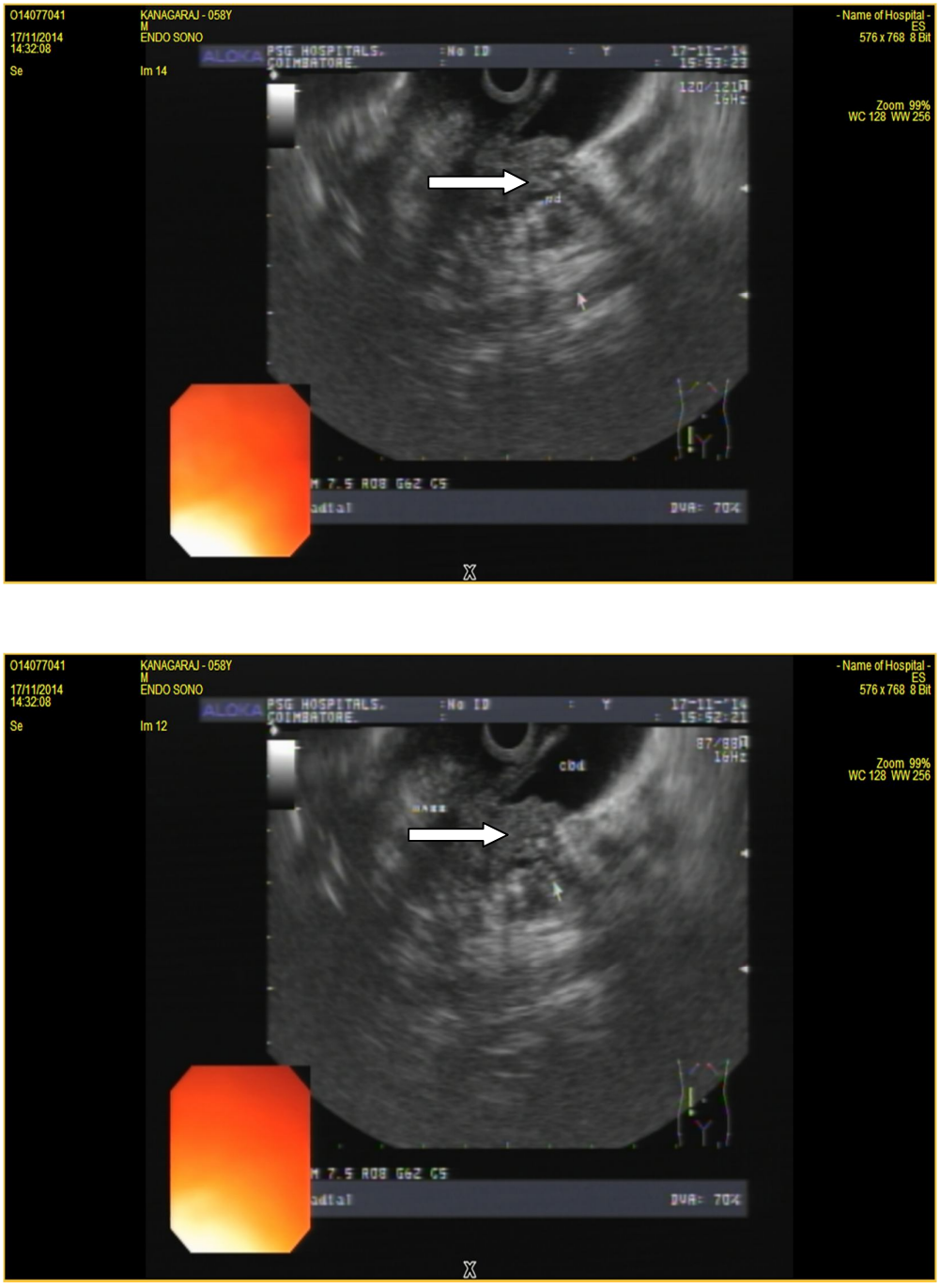


FIG 29 : CASE 1 : PANCREATIC ADENOCARCINOMA: Endoscopic ultrasound images showing hypoechoiec mass lesion in the head of pancreas involving the lower CBD and duodenal wall. Portal vein is free

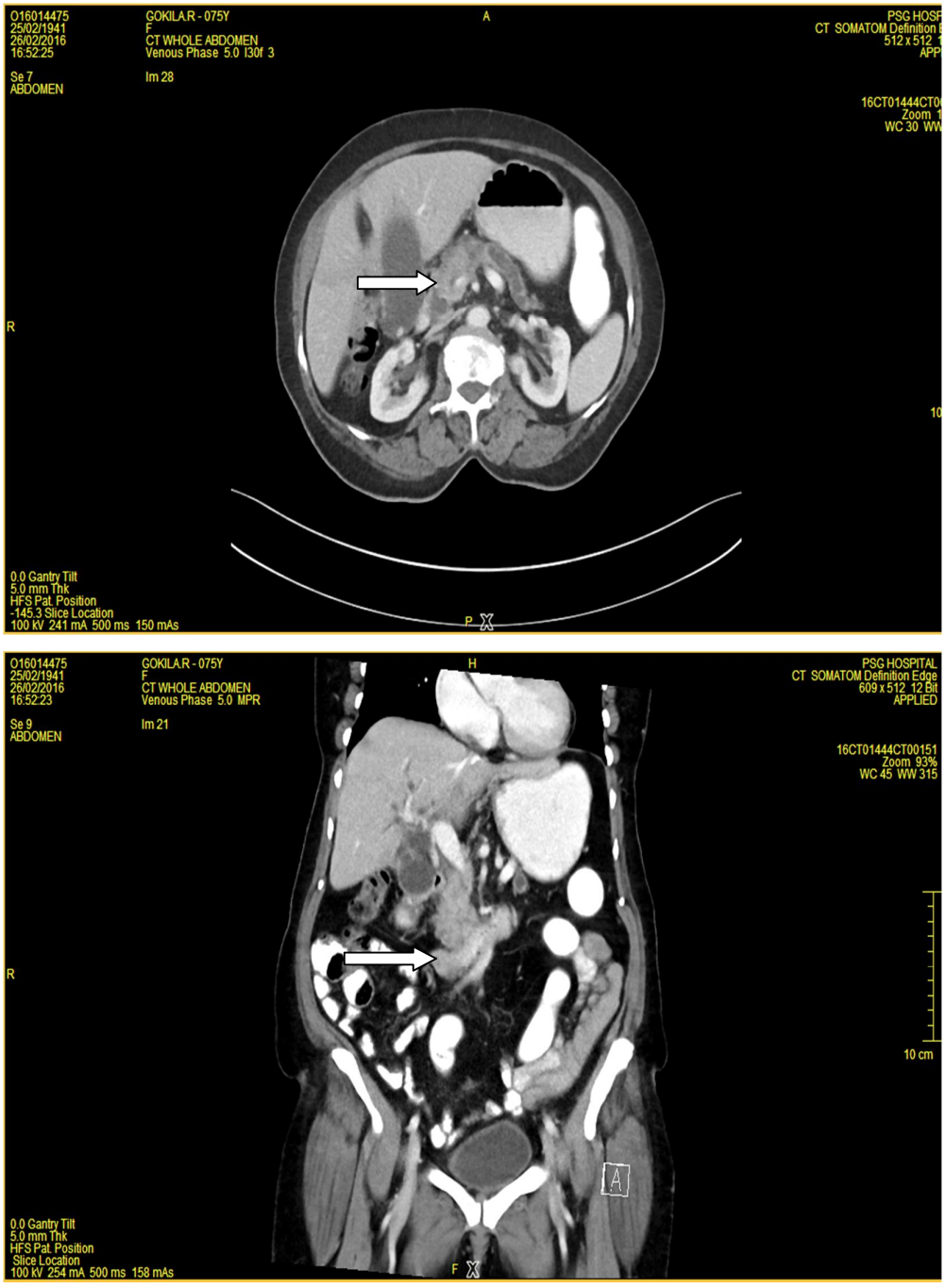


FIG 30: CASE 2: PANCREATIC ADENOCARCINOMA : Axial and coronal MDCT images showing poorly defined hypoenhacing malignant mass lesion in the head of pancreas causing biliary and pancreatic duct obstruction.The lesion is invading the portal vein formation, proximal portal vein and superior mesenteric vein. There is complete atrophy of body and tail of pancreas.

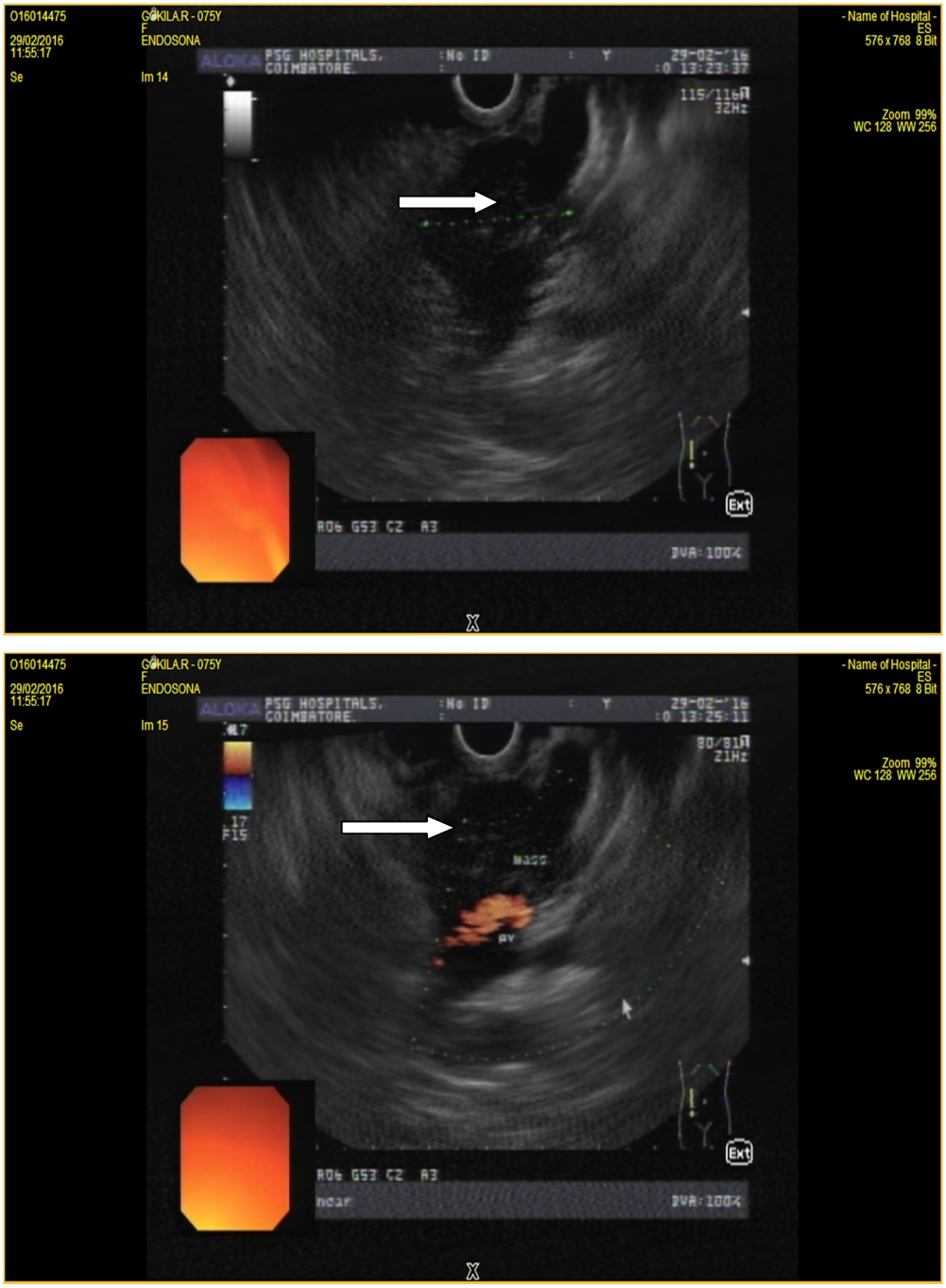


FIG 30: CASE 2 : PANCREATIC ADENOCARCINOMA: Endoscopic ultrasound images showing hypoechoeic mass lesion in the head of pancreas involving the lower end of common bile duct causing common bile duct obstruction.Portal vein interface is lost with the lesion. Superior mesenteric artery is normal. Pancreatic parenchyma is atrophic. Main pancreatic duct is dilated

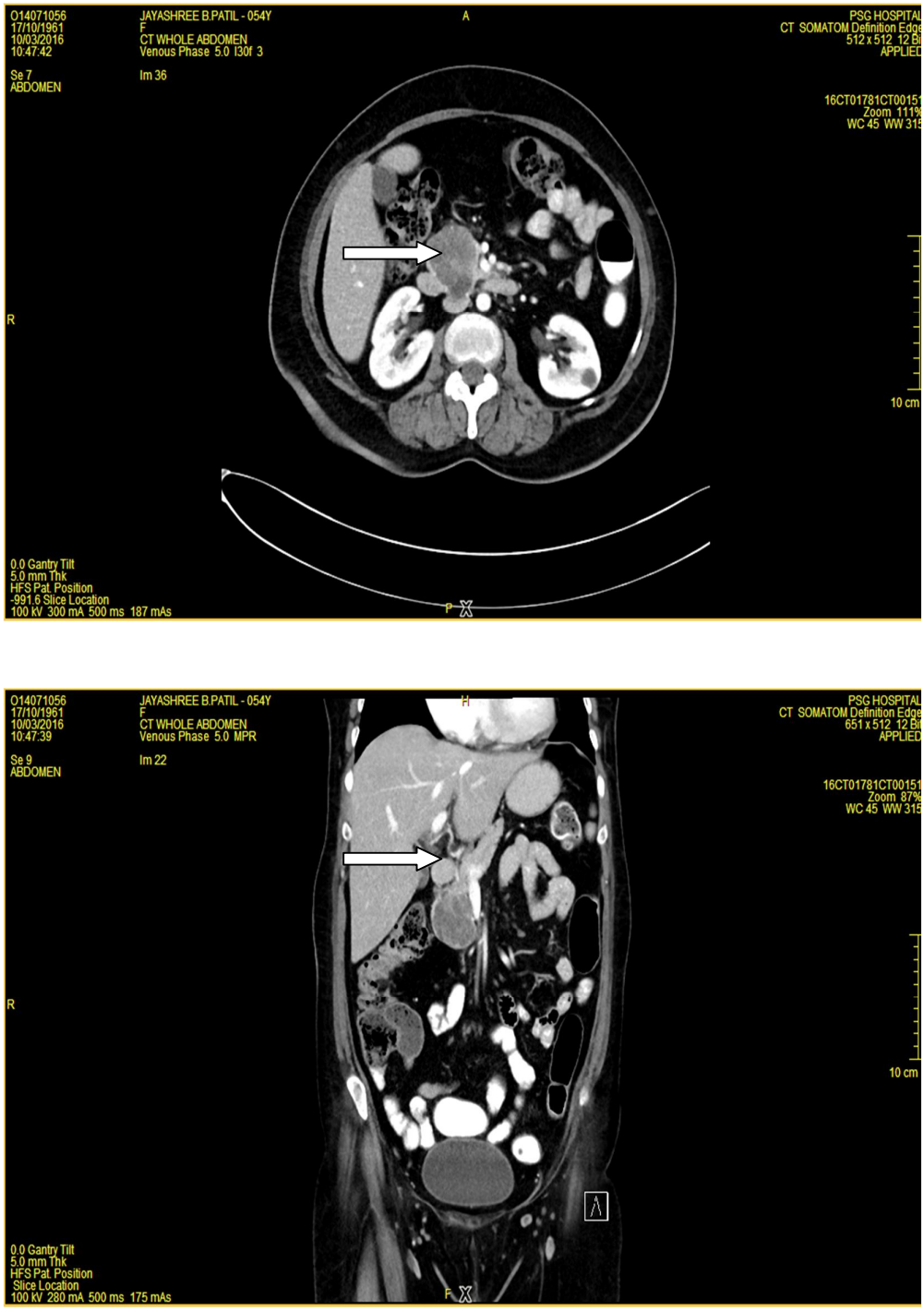


FIG 31: CASE 3 : SEROUS CYSTADENOMA : Axial and coronal MDCT images showing multiseptated cystic lesion with enhancing irregular thick sepate and showing few tiny calcifications in the head and uncinate process of pancreas

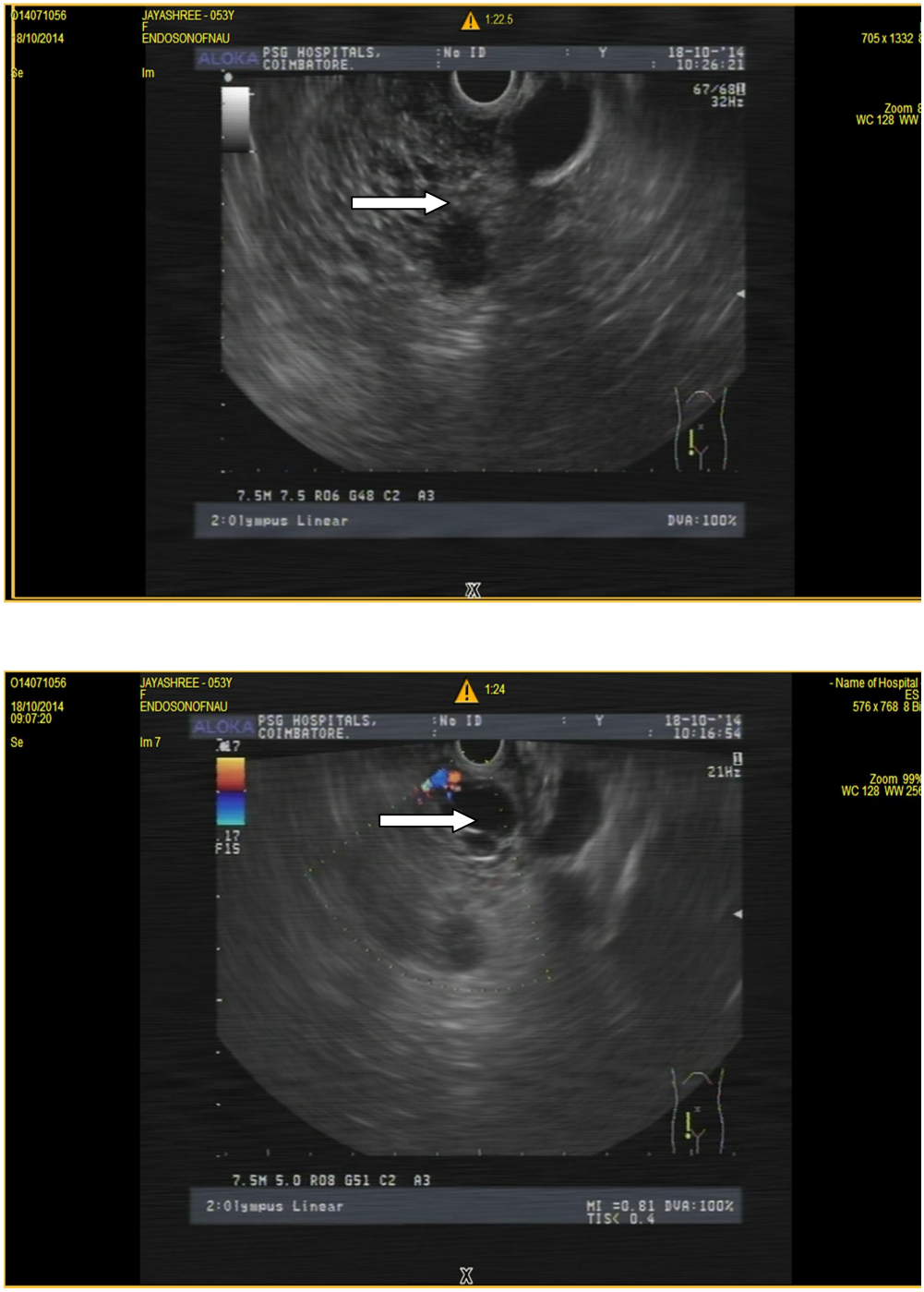


FIG 31: CASE 3 : SEROUS CYSTADENOMA : Endoscopic ultrasound images showing well defined hypoechoeic lesion in the head of pancreas. Mutiple small anechoiec cystic areas are seen in the lesion with honeycomb appearance. Specks of calcification seen in the lesion.

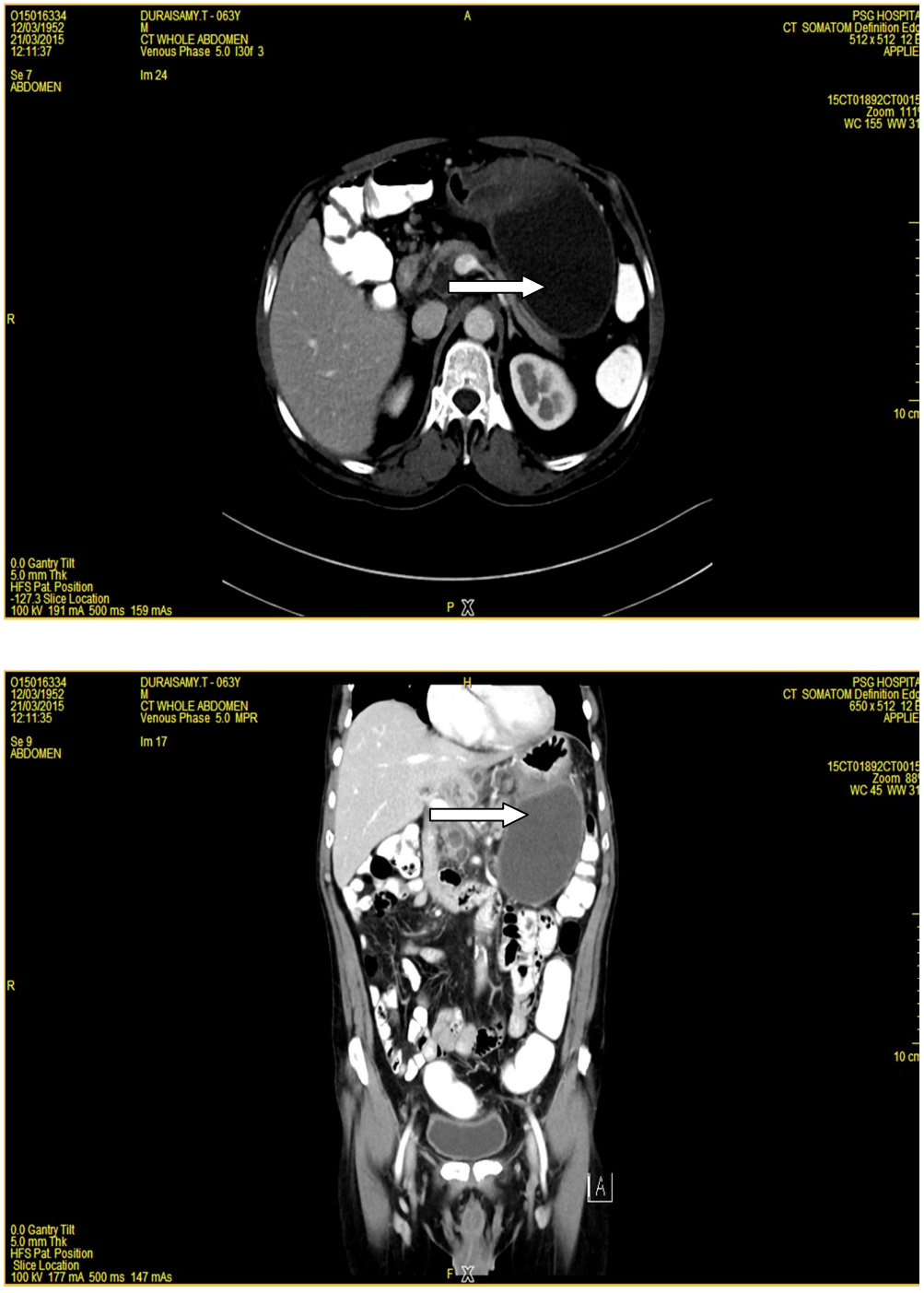


FIG 32: CASE 4: PSEUDOCYST OF PANCREAS : Axial and coronal MDCT images showing large pseudocyst with enhancing wall anterior to tail of pancreas. small pseudocysts are seen in superior head of pancreas. Pancreatic parenchyma is atrophic. Main pancreatic duct is dilated. Intrahepatic biliary radicles are dilated.

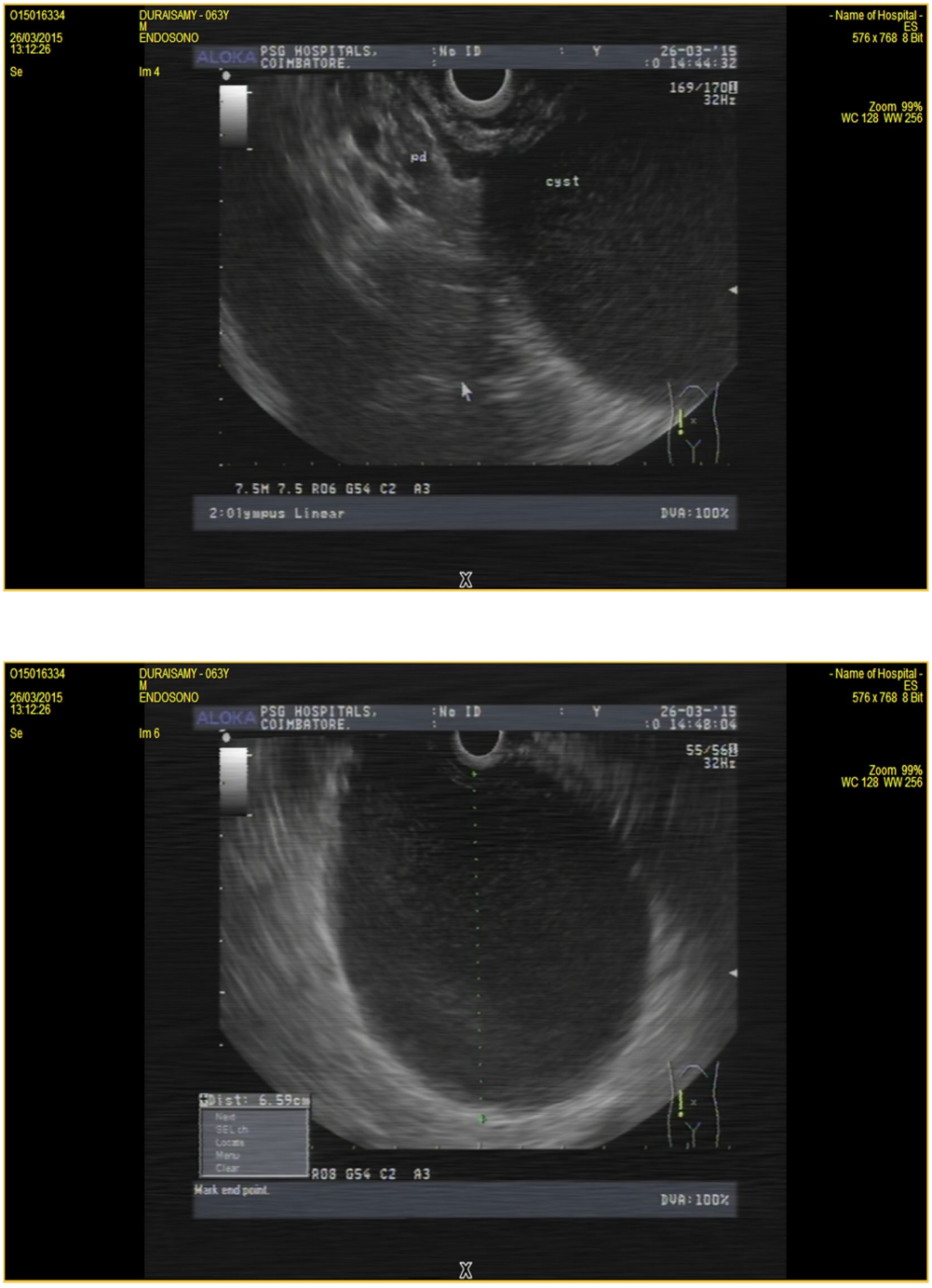


FIG 32: CASE 4: PSEUDOCYST OF PANCREAS : Endoscopic ultrasound images showing large pseudocyst anterior to tail of pancreas. Small amount of debris seen within

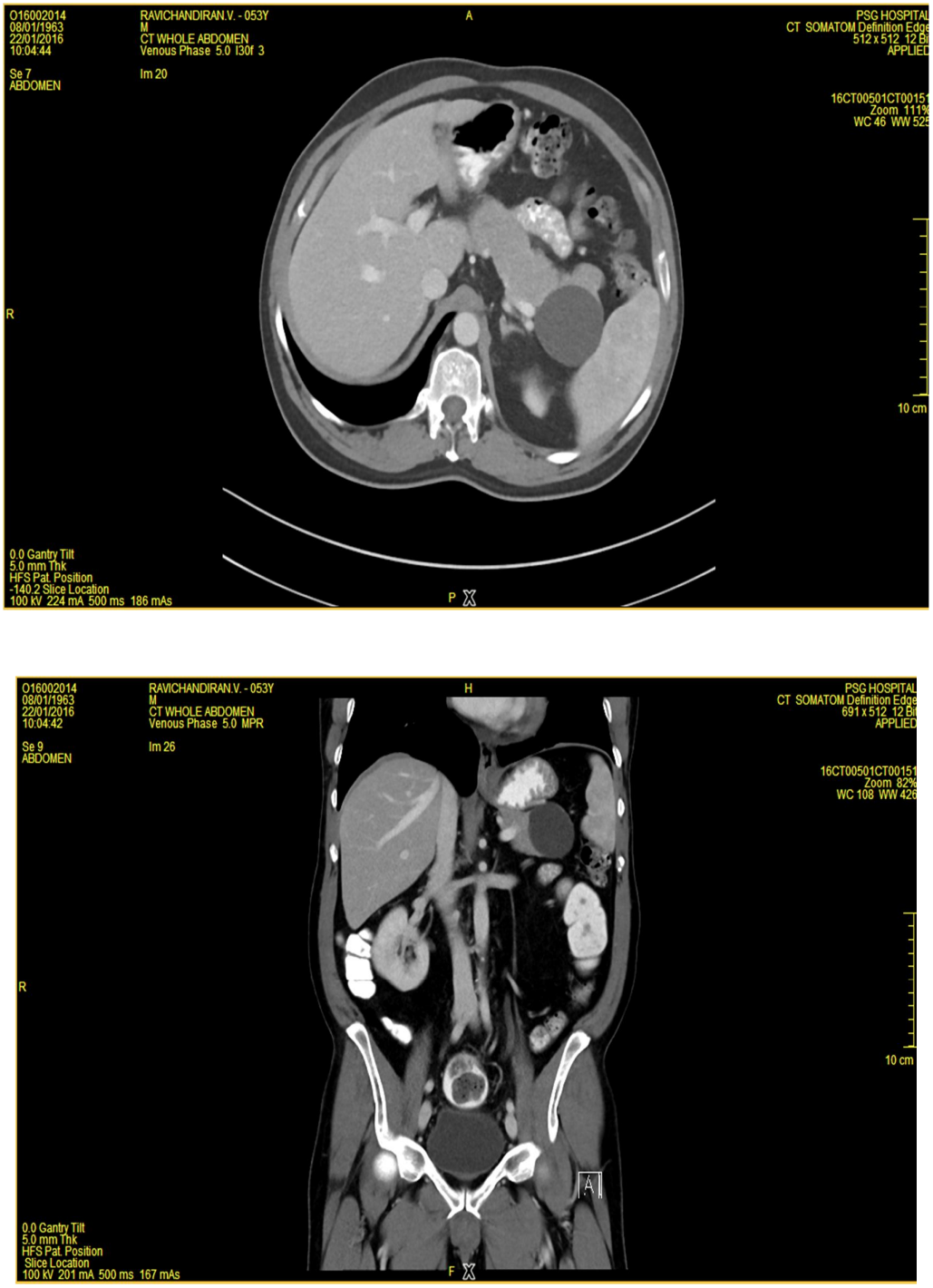


FIG 33: CASE 5: SIMPLE CYST : Axial and coronal MDCT images showing well defined cystic lesion with fluid density in the tail of pancreas. No obvious solid components or thick septae seen.

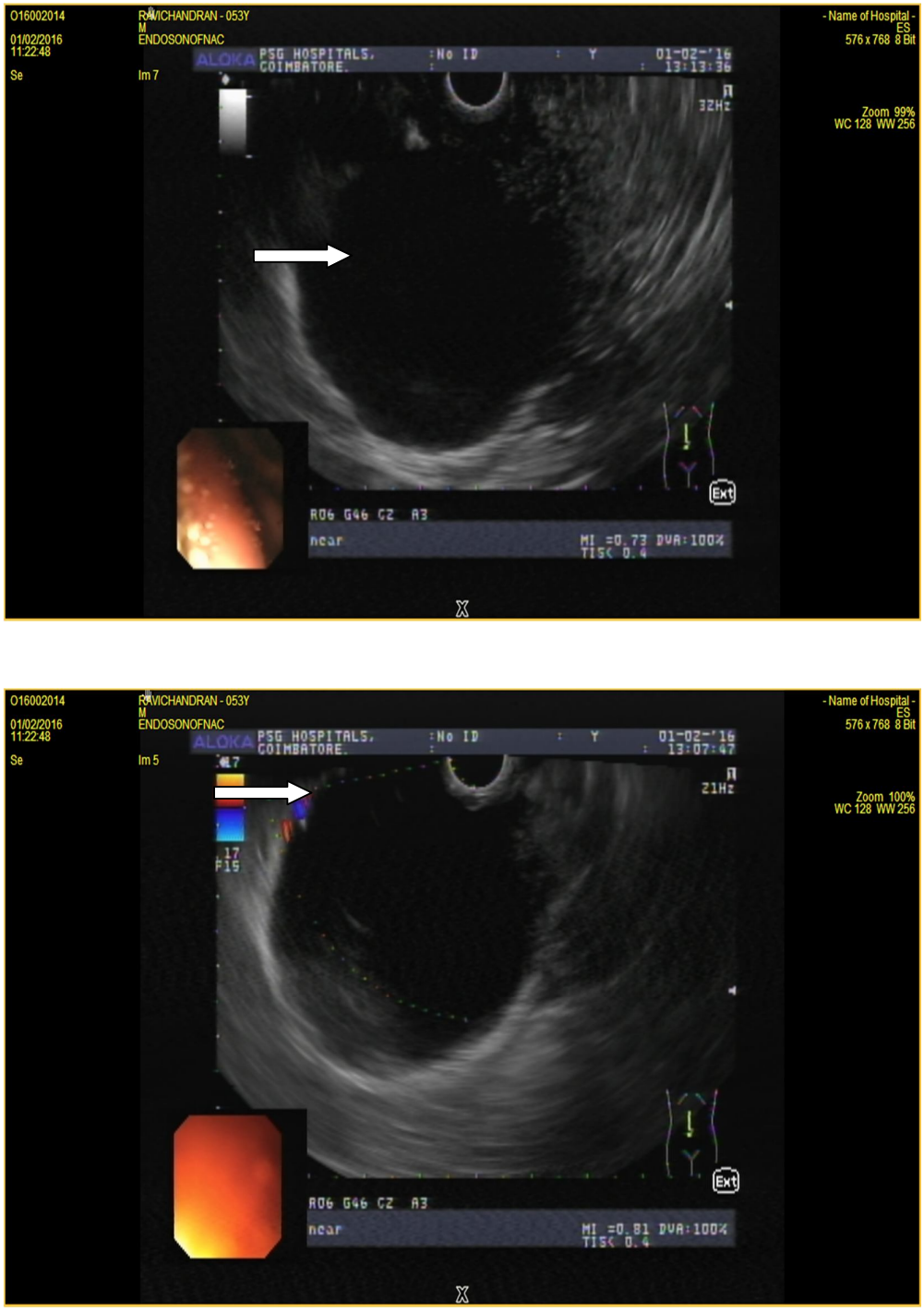


FIG 33: CASE 5: SIMPLE CYST : Cyst in the tail of pancreas with no septations or mural nodules.

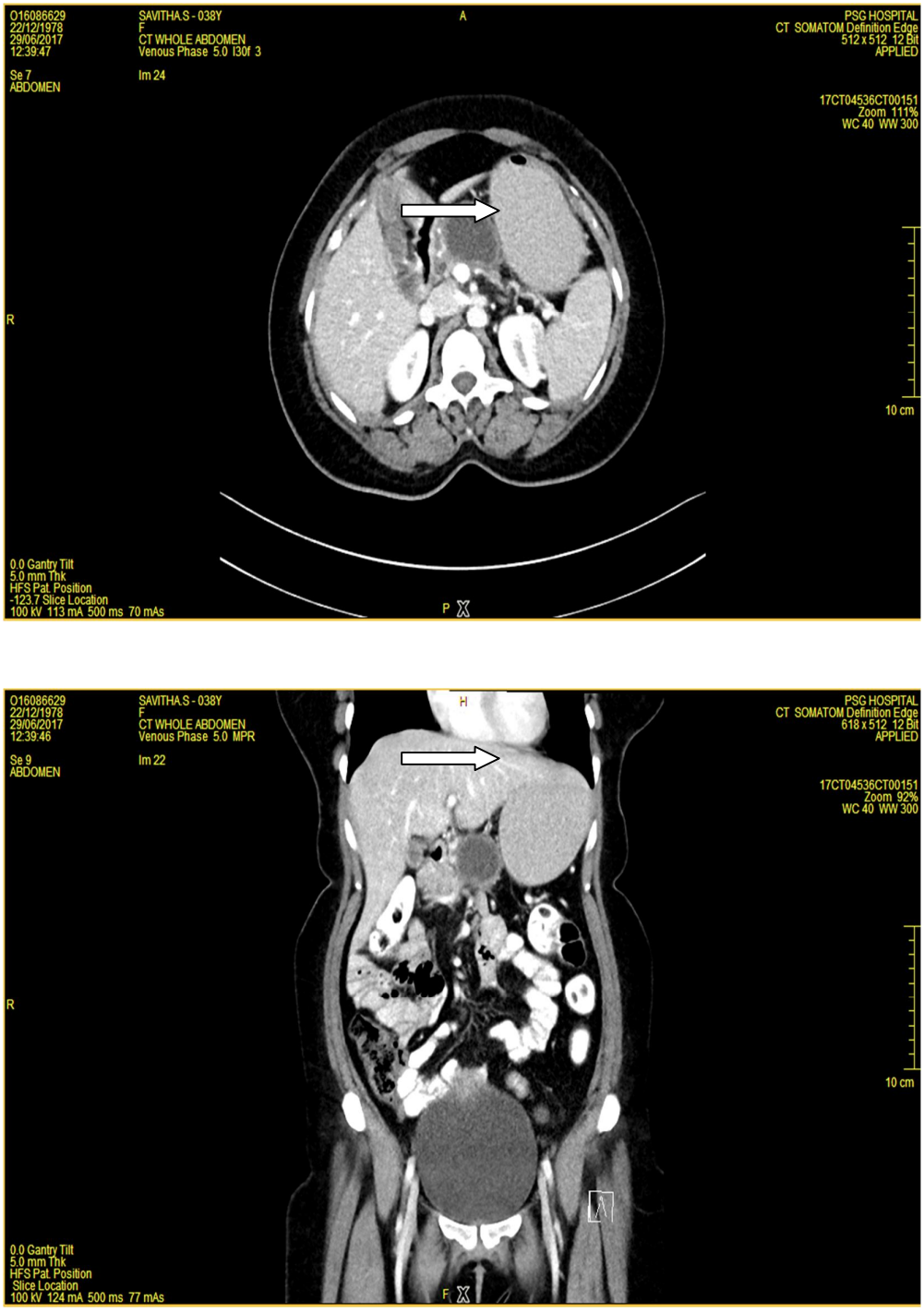


FIG 34: CASE 6: MUCINOUS CYSTADENOMA : Axial and coronal MDCT images showing well defined hypodense cystic lesion with tiny peripheral calcifications in the wall showing peripheral enhancement in the body of pancreas.

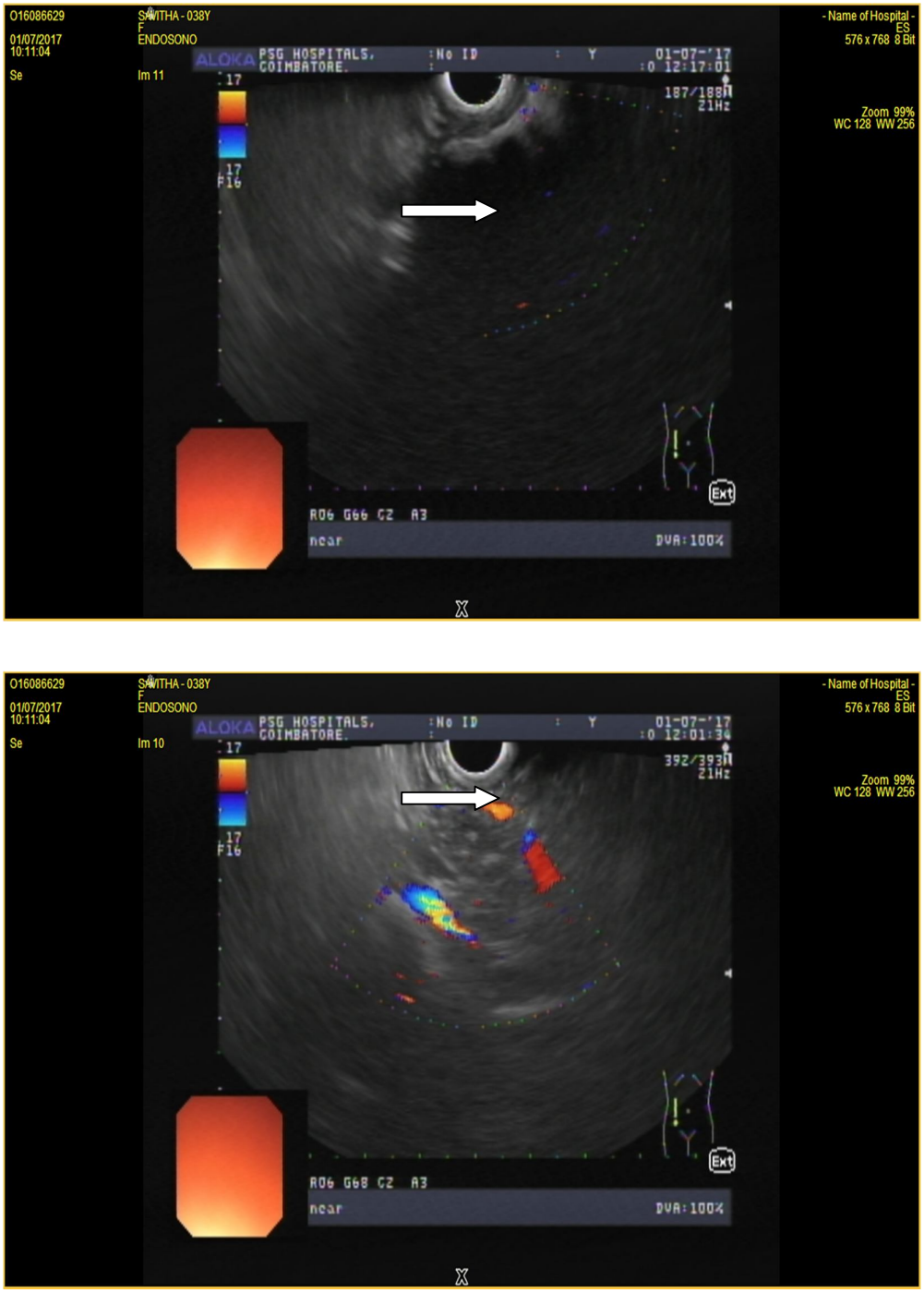


FIG 34: CASE 6: MUCINOUS CYSTADENOMA: Endoscopic ultrasound showing cystic lesion in the body of pancreas. wall of the cyst is calcified casting acoustic shadowing.

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ANNEXURES

LIST OF ABBREVATIONS

MDCT	–	MULTIDETECTOR COMPUTED TOMOGRAPHY
MRI	–	MAGNETIC RESONANCE IMAGING
EUS	–	ENDOSCOPIC ULTRASOUND
FNAC	–	FINE NEEDLE ASPIRATION CYTOLOGY
MRCP	–	MAGNETIC RESONANCE CHOLANGIOPANCREATICOGRAPHY
ERCP	–	ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY
SCN	–	SEROUS CYSTADENOMA
MCN	–	MUCINOUS CYSTADENOMA
IPMN	–	INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM
IPMT	–	INTRADUCTAL PAPILLARY MUCINOUS TUMOUR
PDAC	–	PANCREATIC DUCTAL ADENOCARCINOMA

ஒப்புதல் படிவம்

தேதி :

ந.ஐஸ்வரியா லட்சுமி ஆகிய நான் , PSG மருத்துவக் கல்லூரியின் கதிர்வீச்சு துறையின் கீழ் குவிய கணைய புண்கள் மதிப்பீடு பல கண்டறியும் கருவியின் கணித்த (128 துண்டு) பங்கு என்ற தலைப்பில் ஆய்வு மேற்கொள்ள உள்ளேன்.

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1. குவிய கணைய புண்கள் பண்பு பல கண்டறியும் கருவியின் கணித்த (128 துண்டு) துல்லியம் தீர்மானிக்க

2. எண்டோஸ்கோபி மீயொலி, அறுவை சிகிச்சைப் ,உயிர் அணுக்களைப் பற்றிய பல கண்டறியும் கருவியின் கணித்த கண்டுபிடிப்புகள், திசு நோய்க்குறியியல் கண்டுபிடிப்புகள் தொடர்பு மற்றும் பின்பற்ற

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சரியான அறுதியிடல் நோயாளிகளுக்கு சரியான சிகிச்சை வழிவகுக்கும்.

ஆய்வினால் ஏற்படும் அசௌகரியங்கள் / பக்க விளைவுகள் ;

பக்க விளைவுகள் இல்லை

இந்த ஆய்வில் கிடைக்கும் தகவல்கள் 2 வருடங்கள் பாதுகாக்கப்படும். இவை வேறு எந்த ஆய்விற்கும் பயன்படுத்தப் பட மாட்டாது . எந்த நிலையிலும் உங்களைப் பற்றிய தகவல்கள் யாருக்கும் தெரிவிக்கபட மாட்டாது .இவை இரகசியமாக வைக்கப்படும்.

இந்த ஆய்வில் பங்கேற்க ஒப்புக்கொள்ளுவதால் எந்த விதமான பலனும் உங்களுக்கு கிடைக்காது . எந்த நேரத்தில் வேண்டுமானாலும் ஆய்விலிருந்து விலகிக்கொள்ளம் உரிமை உங்களுக்கு உண்டு . ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சையில் எந்த வித மாற்றமும் இருக்காது .

இந்த ஆராய்ச்சிக்காக உங்களிடம் சில கேள்விகள் கேட்கப்படும் / சில இரத்த மாதிரிகள் அல்லது திசு மாதிரிகள் எடுக்கப்படும்.

மேலும் இந்த ஆய்வில் பங்கு கொள்வது உங்கள் சொந்த விருப்பம் . இதில் எந்த விதக் கட்டாயமும் இல்லை நீங்கள் விருப்பப் பட்டால் இந்த ஆய்வின் முடிவுகள் உங்களுக்குத் தெரியப் படுத்தப்படும் .

ஆய்வாளர் கையொப்பம் :

தேதி :

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நான் இந்த ஆராய்ச்சியின் நோக்கம் மற்றும் அதன் பயன்பாட்டினைப் பற்றி தெளிவாகவும் விளக்காமாகவும் தெரியப்படுத்தப்பட்டுள்ளேன் இந்த ஆராய்ச்சியில் பங்கு கொள்ளவும் இந்த ஆராய்ச்சியின் மருதுவ ரீதியான குறிப்புகளை வரும் காலத்திலும் உபயோகப்படுதிக் கொள்ளவும் முழு மனதுடன் சம்மதிக்கின்றேன்.

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தேதி :

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MASTER CHART

S.NO	IP /OP NUMBER	AGE	SEX	CLINICAL FINDINGS	SERUM AMYLASE /LIPASE	CA 19-9	BILIRUBIN	ULTRASOUND	MDCT	LOCATION	VASCULAR INVASION	REGIONAL LYMPH NODES	DISTANT METATSASES	ENDOSCOPIC ULTRASOUND	LOCATION	FNAC	MANAGEMENT
1	I14032192	58	MALE	FEVER, JAUNDICE	NORMAL	ELEVATED	ELEVATED	LESION DETECTED	MALIGNANT LESION	HEAD	NIL	NO	NIL	BENIGN LESION	HEAD	MALIGNANT - ADENOCARCINOMA	SURGERY
2	I16006914	75	FEMALE	EPIGASTRIC PAIN	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	HEAD	PRESENT	PRESENT	NIL	MALIGNANT LESION	HEAD	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
3	I14015561	60	MALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	ELEVATED	ELEVATED	DETECTED	MALIGNANT LESION	HEAD	PRESENT	PRESENT	NIL	MALIGNANT LESION	HEAD	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
4	I15007725	50	MALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	ELEVATED	ELEVATED	DETECTED	MALIGNANT LESION	HEAD	PRESENT	PRESENT	NIL	MALIGNANT LESION	JUNCTION OF HEAD AND BODY	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
5	I15038548	41	MALE	EPIGASTRIC PAIN	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	BODY	NIL	NIL	NIL	BENIGN LESION	BODY	MALIGNANT - ADENOCARCINOMA	SURGERY
6	I16020831	47	FEMALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	ELEVATED	ELEVATED	NOT DETECTED	MALIGNANT LESION	BODY	PRESENT	NIL	NIL	MALIGNANT LESION	BODY	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
7	I13038935	48	FEMALE	ANOREXIA, WEIGHT LOSS, JAUNDICE	NORMAL	ELEVATED	ELEVATED	DETECTED	MALIGNANT LESION	HEAD	NIL	NIL	NIL	BENIGN LESION	HEAD	MALIGNANT - ADENOCARCINOMA	SURGERY
8	I13022011	65	MALE	EPIGASTRIC PAIN, WEIGHT LOSS	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	HEAD	PRESENT	NIL	NIL	MALIGNANT LESION	HEAD	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
9	I13021826	40	MALE	EPIGASTRIC PAIN, WEIGHT LOSS, JAUNDICE	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	UNCINATE PROCESS	PRESENT	NIL	NIL	MALIGNANT LESION	UNCINATE PROCESS	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
10	I13017588	47	MALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	ELEVATED	ELEVATED	DETECTED	MALIGNANT LESION	HEAD AND NECK	PRESENT	NIL	PRESENT	MALIGNANT LESION	HEAD AND NECK	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
11	O07062939	63	MALE	EPIGASTRIC PAIN, WEIGHT LOSS	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	NECK AND BODY	PRESENT	PRESENT	NIL	MALIGNANT LESION	HEAD AND BODY	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
12	I13009271	51	MALE	ANOREXIA, WEIGHT LOSS	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	POSTERIOR BODY	PRESENT	PRESENT	NIL	MALIGNANT LESION	HEAD	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
13	I17020559	69	MALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	ELEVATED	ELEVATED	DETECTED	MALIGNANT LESION	HEAD	PRESENT	NIL	PRESENT	MALIGNANT LESION	HEAD	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
14	I17024259	52	FEMALE	EPIGASTRIC PAIN, VOMITING, WEIGHT LOSS,JAUNDICE	NORMAL	ELEVATED	ELEVATED	DETECTED	MALIGNANT LESION	HEAD	PRESENT	NIL	NIL	MALIGNANT LESION	HEAD	MALIGNANT - ADENOCARCINOMA	PALLIATIVE
15	O14047315	48	MALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	ELEVATED	NORMAL	DETECTED	MALIGNANT LESION	HEAD	PRESENT	NIL	NIL	MALIGNANT LESION	HEAD AND BODY	MUCINOUS CYSTADENOCARCINOMA	PALLIATIVE
16	I15016950	54	MALE	EPIGASTRIC PAIN	NORMAL	NORMAL	NORMAL	DETECTED	MALIGNANT LESION	UNCINATE PROCESS	PRESENT	PRESENT	NIL	MALIGNANT LESION	HEAD	NO MALIGNANCY	CONSERVATIVE
17	I1303044	36	FEMALE	EPIGASTRIC PAIN, JAUNDICE	NORMAL	NORMAL	ELEVATED	NOT DETECTED	MALIGNANT LESION	HEAD AND UNCINATE PROCESS	NIL	NIL	NIL	MALIGNANT LESION	UNCINATE PROCESS	NEUROENDOCRINE NEOPLASM	CONSERVATIVE
18	I15010527	34	MALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	DETECTED	PSEUDOCYST	BODY AND TAIL	NIL	NIL	N/A	PSEUDOCYST	BODY	PSEUDOCYST	TRANSMURAL DRAINAGE
19	I15012764	31	FEMALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	DETECTED	PSEUDOCYST	BODY	NIL	NIL	N/A	PSEUDOCYST	BODY	PSEUDOCYST	TRANSMURAL DRAINAGE

S.NO	IP /OP NUMBER	AGE	SEX	CLINICAL FINDINGS	SERUM AMYLASE /LIPASE	CA 19-9	BILIRUBIN	ULTRASOUND	MDCT	LOCATION	VASCULAR INVASION	REGIONAL LYMPH NODES	DISTANT METATSASES	ENDOSCOPIC ULTRASOUND	LOCATION	FNAC	MANAGEMENT
20	I15013647	32	FEMALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	DETECTED	PSEUDOCYST	BODY	NIL	NIL	N/A	PSEUDOCYST	BODY	PSEUDOCYST	TRANSMURAL DRAINAGE
21	I15008491	63	MALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	DETECTED	PSEUDOCYST	TAIL	NIL	NIL	N/A	PSEUDOCYST	TAIL	PSEUDOCYST	CYSTOGASTROSTOMY
22	O14043790	45	MALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	DETECTED	PSEUDOCYST	HEAD AND UNCCINATE PROCESS	NIL	NIL	N/A	PSEUDOCYST	UNCINATE PROCESS	PSEUDOCYST	TRANSMURAL DRAINAGE
23	I14037622	32	MALE	ABDOMINAL PAIN	NORMAL	NORMAL	NORMAL	NOT DETECTED	PSEUDOCYST	HEAD	NIL	NIL	N/A	PSEUDOCYST	HEAD	PSEUDOCYST	CONSERVATIVE
24	I15007387	65	MALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	NOT DETECTED	PSEUDOCYST	HEAD	NIL	NIL	N/A	MALIGNANT LESION	HEAD	MALIGNANT LESION	PALLIATIVE
25	O15023344	48	MALE	ABDOMINAL PAIN	ELEVATED	ELEVATED	NORMAL	DETECTED	PSEUDOCYST	HEAD AND BODY	NIL	NIL	N/A	MALIGNANT LESION	HEAD	PSEUDOCYST	CONSERVATIVE
26	I15019952	40	MALE	ABDOMINAL PAIN	NORMAL	ELEVATED	NORMAL	DETECTED	PSEUDOCYST	HEAD	NIL	NIL	N/A	MALIGNANT LESION	HEAD	MALIGNANT LESION	CONSERVATIVE
27	I14012663	55	MALE	EPIGASTRIC PAIN	NORMAL	NORMAL	NORMAL	DETECTED	PSEUDOCYST	HEAD AND BODY	NIL	NIL	N/A	PSEUDOCYST	BODY	PSEUDOCYST	TRANSMURAL DRAINAGE
28	I13014642	51	MALE	JAUNDICE	ELEVATED	NORMAL	NORMAL	NOT DETECTED	PSEUDOCYST	BODY	NIL	NIL	N/A	PSEUDOCYST	BODY	PSEUDOCYST	CONSERVATIVE
29	I17026719	18	MALE	EPIGASTRIC PAIN ,VOMITING	ELEVATED	NORMAL	NORMAL	DETECTED	PSEUDOCYST	HEAD AND BODY	NIL	NIL	N/A	PSEUDOCYST	HEAD	PSEUDOCYST	CYSTOGASTROSTOMY
30	I17026303	38	FEMALE	NO SYMPTOMS	NORMAL	NORMAL	NORMAL	DETECTED	MUCINOUS CYSTADENOMA	BODY	NIL	NIL	N/A	MUCINOUS CYSTADENOMA	BODY	BENIGN MUCINOUS CYSTIC LESION	CONSERVATIVE
31	I17024867	41	FEMALE	ABDOMINAL PAIN	NORMAL	NORMAL	NORMAL	DETECTED	MUCINOUS CYSTADENOMA	BODY	NIL	NIL	N/A	MUCINOUS CYSTADENOMA	BODY	BENIGN MUCINOUS CYSIC LESION	CONSERVATIVE
32	I13007780	31	FEMALE	ABDOMINAL PAIN	NORMAL	ELEVATED	NORMAL	DETECTED	MUCINOUS CYSTADENOMA	BODY AND TAIL	NIL	NIL	N/A	MUCINOUS CYSTADENOMA	BODY	BENIGN MUCINOUS CYSTIC LESION	CONSERVATIVE
33	I16000993	53	MALE	ABDOMINAL PAIN	NORMAL	NORMAL	NORMAL	DETECTED	SIMPLE CYST	TAIL	NIL	NIL	N/A	SIMPLE CYST	TAIL	CYSTIC LESION	CONSERVATIVE
34	I14011009	70	MALE	ABDOMINAL PAIN	ELEVATED	NORMAL	NORMAL	NOT DETECTED	BENIGN CYSTIC LESION	HEAD	NIL	NIL	N/A	BENIGN LESION	HEAD	BENIGN INFLAMMATORY LESION	CONSERVATIVE
35	I14003523	65	MALE	ABDOMINAL PAIN	NORMAL	ELEVATED	NORMAL	NOT DETECTED	FOCAL PANCREATITS	HEAD	NIL	NIL	N/A	FOCAL PANCREATITIS	HEAD	FOCAL PANCREATITIS	CONSERVATIVE
36	O14071056	53	FEMALE	ABDOMINAL PAIN	NORMAL	NORMAL	NORMAL	DETECTED	SEROUS CYSTADENOMA	HEAD AND UNCINATE PROCESS	NIL	NIL	N/A	SEROUS CYSTADENOMA	HEAD AND UNCINATE PROCESS	SEROUS CYSTIC LESION	CONSERVATIVE
37	O12023315	69	FEMALE	ABDOMINAL PAIN	NORMAL	NORMAL	NORMAL	DETECTED	SEROUS CYSTADENOMA	HEAD	NIL	NIL	N/A	SEROUS CYSTADENOMA	HEAD	SEROUS CYSTIC LESION	CONSERVATIVE
38	O12045819	65	MALE	EPIGASTRIC PAIN	NORMAL	NORMAL	NORMAL	DETECTED	SEROUS CYSTADENOMA	HEAD	NIL	NIL	N/A	SEROUS CYSTADENOMA	NECK	SEROUS CYSTIC LESION	CONSERVATIVE
39	I16038365	64	FEMALE	NO SYMPTOMS	NORMAL	NORMAL	NORMAL	DETECTED	SEROUS CYSTADENOMA	HEAD AND BODY	NIL	NIL	N/A	SEROUS CYSTADENOMA	HEAD	SEROUS CYSTIC LESION	CONSERVATIVE
40	O12026244	59	MALE	EPIGASTRIC PAIN	NORMAL	NORMAL	NORMAL	DETECTED	SEROUS CYSTADENOMA	HEAD	NIL	NIL	N/A	SEROUS CYSTADENOMA	HEAD	SEROUS CYSTIC LESION	CONSERVATIVE
41	I15008201	52	MALE	ABDOMINAL PAIN	NORMAL	NORMAL	NORMAL	DETECTED	IPMN	UNCINATE PROCESS	NIL	NIL	N/A	IPMN	UNCINATE PROCESS	BENIGN MUCINOUS LESION	CONSERVATIVE
42	I14030987	62	FEMALE	ABDOMINAL PAIN	NORMAL	ELEVATED	NORMAL	DETECTED	IPMN	UNCINATE PROCESS	NIL	NIL	N/A	IPMN	UNCINATE PROCESS	BENIGN MUCINOUS LESION	CONSERVATIVE